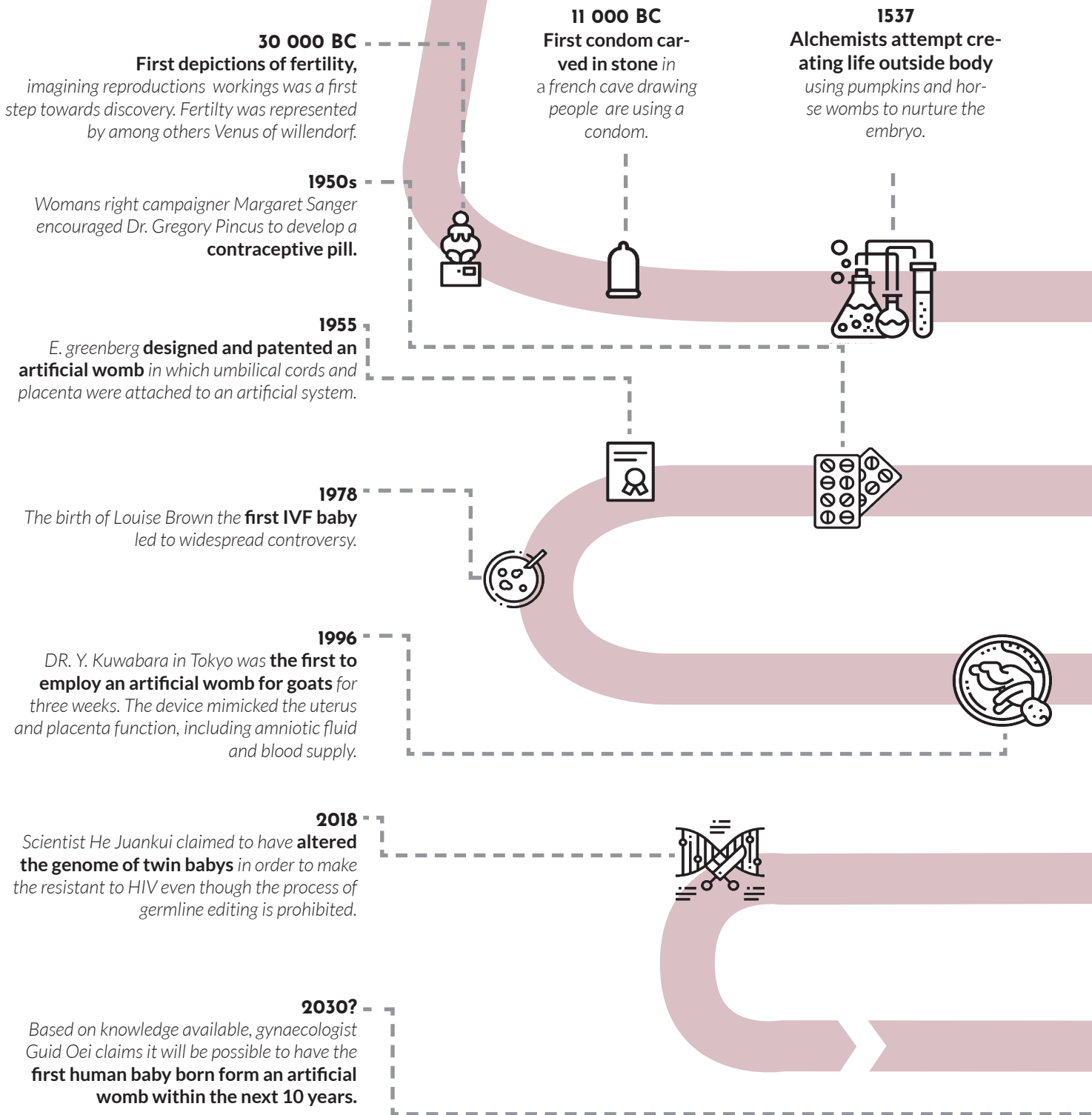


Appendix

A. Reproductive timeline



The timeline shows **we have always tried to both understand and steer the process of reproduction**, be it through worship or through science. **Reproductive developments often involve some kind of societal changes**, see the pill and feminism relationship. It also **puts current reproductive predictions in perspective**, they do not seem weird or extreme when we look back at the developments that already have taken place.

1896

**Baby incubators
in theme park in
New York as**

*Dr. Couney decided
to put his premature
patients on display
to raise funds.*



1924

Aldous Huxley **introduced the artificial womb** in his iconic novel *brave new world*.

1945

Increased use of condoms in World War II as condoms were distributed to male U.S. military members and heavily promoted (Collier, Aine, 2007)

2007

Birth technology and genetic manipulation are now ethically monitored due to the **Assisted Reproductive Technologies Act** (NSW government, 2007)

2014

A women in Sweden gave **birth using a transplanted womb**. The mother, who was born without a uterus, received a womb from a friend.

2017

Researchers in Philadelphia **grew premature lambs in a Biobag** for four weeks. The bag was equipped with artificial oxygen, carbon dioxide and nutrient circulation. (Partridge, E. A. 2017)

2035?

Are **same sex couples** allowed to genetically reproduce?



Artificial womb?



Same sex reproduction?






Source: Information from Next Nature Network reproductive flyer, otherwise source is mentioned.

B. Context factors

Context factors

Cluster	Property	Tags	Factor theme	Source
Untitled	social identifica- tion is one of the prime bases for participa- tion in social movements (Simon, Loewy, Stuermer, Weber, Freytag, Habig, Kampmeier, and Spahlinger 1998).			(Simon, Loewy, Stuermer, Weber, Freytag, Habig, Kar
Bye Bye nuclear	Alone-together time has increased by nearly 30 minutes a day between 2000 and 2015, a period which saw the rapid diffusion of high-quality home internet and personal mobile devices such as smartphones and tablets. There is no decline in the amount of time families spent in shared activities between 2000 and 2015.	Development	Family	http://www.ox.ac.uk/news/2019-03-12-mobile-devic-study-finds# Stella Chatzitheochari and Dr Killian Mu Changing Times Together? A Time-Diary Analysis of United Kingdom https://onlinelibrary.wiley.com/doi/ft Volume81, Issue4
Bye bye nuclear family.	“The kids from poly families are pros at establishing new relationships. They’ve been growing up marinated in personal growth and honesty, and exposed to a wide range of ideas. Particularly since most grow up in an environment designed to foster independent thought.”	Principle		The Psychology Of Sex, Dr Meg-John Barker
Bye bye nuclear family.	“There’s no reason to believe that monogamy is any better [or worse] than other family structures – of which poly families are just one,” “Structures with more adults involved, and more community support around them, may well work better for many people.	Development Principle		The Psychology Of Sex, Dr Meg-John Barker 2018
Bye bye nuclear family.	we’re now beginning to see single fathers by choice.	Trend		the guardian https://www.theguardian.com/lifeandst/wombs-robot-carers-single-fathers

Aa Cluster	≡ Property	≡ Tags	≡ Factor theme	≡ Source
<u>Bye bye nuclear family</u>	<p>“What we’re finding is that family structure is actually less important for children than the quality of relationships within families,” says Golombok. “And also the social acceptance of their family in the wider world. Families are changing and it’s not necessarily a bad thing for children or parents.”</p>	<div>Principle</div> <div>Trend</div>		the guardian https://www.theguardian.com/lifeandstyle/wombs-robot-carers-single-fathers
<u>Bye bye nuclear family</u>	<p>There will be challenges, of course, to living in a quasi-communal multi-family household, such as getting along, respecting each other’s property, excessive noise, sharing common resources, conflicting parenting styles, and so on.</p>			https://io9.gizmodo.com/9-different-visions-of-what
<u>Bye bye nuclear family</u>	<p>The increase in childless-couple households, divorce rates, remarriages and step-families may weaken family ties .</p>	<div>Development</div>		International furies program report (the future familie
<u>Bye bye nuclear family</u>	<p>Family communication is defined as the act of making information, ideas, thoughts and feelings known within members of a family unit (Olson & Barnes, 2010). By changing communication strategies and finding that functional balance, families are better able to address the complexities of development.</p>	<div>Principle</div>		THE IMPACT OF FAMILY FUNCTION ON IDENTITY FC ADULTHOOD (Wallace) (Olson & Barnes, 2010)
<u>Gender as a ritual</u>	<p>While good progress has been made in freeing people from gender-based judgements around what are acceptable roles and behaviors for men and women, there remains much to do to reach a situation of true equality.</p>	<div>Development</div>		promundo https://promundoglobal.org/resources/mexico/#

 Cluster	 Property	 Tags	 Factor theme	 Source
<u>Gender as a ritual</u>	we're obsessed with sexualizing female bodies, and yet the world is "illiterate when it comes to female sexuality."	State		https://time.com/3672297/future-gender-norms/
<u>Gender as a ritual</u>	Young men reap certain benefits from staying inside the Man Box: it provides them with a sense of belonging, of living up to what is expected of them. Friends and parents may praise them. However, when those same norms tell men to be aggressive all the time, to repress emotions, and to fight every time someone threatens them, the Man Box demands that they pretend to be someone they are not, and study results show how violent and lonely the resulting life can be.	State		promundo https://promundoglobal.org/resources/mexico/#
<u>Gender as a ritual</u>	"Artificial eggs and sperm are on the horizon," says Golombok, "which will not just be helpful for infertile heterosexual couples but will allow same-sex couples to both be the biological parents of their children, because that will mean men can produce eggs and sperm, and so can women. For single people who want to have children, it would even be possible for them to produce eggs and sperm."	Development		the guardian https://www.theguardian.com/lifeandstyle/2016/jun/23/wombs-robot-carers-single-fathers
<u>Gender as a ritual</u>	Gender is way more complex than just biologically being a man or woman gender is a type of script that society expects us to act out. gender is performative, it produces a series of effects. gender is not just an identity it is a ritual.	Principle		https://www.youtube.com/watch?time_continue=42&v=8qBt3D38p80 judith butler

Aa Cluster	≡ Property	≡ Tags	≡ Factor theme	≡ Source
<u>Power dynamics</u>	Some people will object to modifying the human genome on a variety of grounds; moral, political, philosophical, religious, aesthetic, and pure emotional grounds. Objections to technologies typically peak as the technology is poised to spread among early adopters but doesn't yet work well. Once the technical bugs are ironed out the moral high ground can invert.			Church and Regis (2012)
<u>Power dynamics in science</u>	In democratic societies, it is the people's prerogative to articulate shared imaginaries of progress and to elect governments to help them achieve their visions. There is however a gap between science and industry which is not politically accountable to the people. Private capital can support lines of research.	Principle		Taylor 2004
<u>Power dynamics in science</u>	Our history includes darker chapters in which state power and biology partnered; eugenic sterilisation, Nazi experimentation etc.	Principle	Politics	sheila jasanoff (2019)
<u>Power dynamics in science</u>	If DNA is the book of life, then biologists can claim priestly roles as the sole authorised readers, the most qualified to interpret the mysteries.	State	Politics Technology	sheila jasanoff (2019)
<u>Power dynamics in science</u>	Zodra mensen zich onderling organiseren in een grotere structuur, levert dit een bepaalde stabiliteit op die de groep helpt te overleven.	Principle	Family Society	Koert van Mensvoort Next Nature

Aa Cluster	Property	Tags	Factor theme	Source
<u>Power dynamics in science</u>	Powerful new techniques for designing and redesigning life came to be seen as answers to old- value laden questions, what counts as a well-lived life, who should be responsible for safeguarding lives on this planet Science does not explicitly claim to offer full-blown answers.	State	Evolution Politics Society Symbolic meaning	sheila jasanoff (2019)
<u>Power dynamics in science</u>	We moeten niet naïef zijn over enkelvoudige technologische ontwikkelingen. Ze bevrijden ons van natuurlijke beperkingen, maar leveren ook een nieuwe situatie op met nieuwe beperkingen en bedreigingen. Het leven blijft dus weinig maakbaar.	Principle		Koert van Mensvoort Next Nature
<u>Power dynamics in science</u>	How far we should go with human genome editing is not a question on which there is even scientific agreement, let alone in the harder question that feminists and other critical theorists have raised of what counts as happiness or parental fulfillment, or the ideal family and society?	State	CRISPR Family Parenthood Society	
<u>Power dynamics in science</u>	Life is lived in relationships, intimate, familial, communal, national and occasionally global. To appreciate life deeply has long been to make sense of what makes life valuable, not to oneself alone but in relation to others ways of being.	Principle	Society	Sheila Jasanoff
<u>Power dynamics in science</u>	It remains a universal condition of the good society that it must encourage the flourishing of life in all its varied meanings.	Principle	Society Symbolic meaning	Sheila Jasanoff

Aa Cluster	≡ Property	≡ Tags	≡ Factor theme	≡ Source
<u>Pressure to buy a better child</u>	Any person, any race, any sex, at any age will have a baby if they desire so.	Development Trend	Parenthood Reproduction	dr. John Zhang in interview 23/03/18 Next Nature
<u>Pressure to buy a better child</u>	The researchers concluded that issues such as deprivation, housing, education and even pollution levels could all influence how your DNA expresses itself as personality.			https://www.truity.com/blog/do-children-inherit-their
<u>Pressure to buy a better child</u>	I we tell parents this gene will increase the probability of mathematical intelligence, this gene may improve his athletic skills: they will do it! People don't realize that sending children to a private school and choosing the best genes are not that different and all serve the same goal. (Zhang)	Principle	CRISPR Parenthood Society	Zhang
<u>Pressure to buy a better child</u>	Parenting practices share three major goals: ensuring children's health and safety, preparing children for life as productive adults and transmitting cultural values.	Principle State		American psychological association https://www.apa
<u>Pressure to buy a better child</u>	Parents are becoming more critical. They are passing down pressures that they feel from society. Things have become tough, the job market has become more precarious, educational achievement has become very important for their children's 'future market price'. There's a lot of pressure on parents now to ensure they raise successful children."	Trend		the guardian https://www.theguardian.com/lifeandst wombs-robot-carers-single-fathers

Cluster	Property	Tags	Factor theme	Source
<u>Pressure to buy a better child</u>	With children a rare resource education may go from among the lowest paying jobs to the highest. This may require very specialised and highly trained parenting - well beyond the current random assignment of child to parent.	Development		George church
<u>Pressure to buy a better child</u>	Relationships within families are arguably the most impactful and persistent in the developmental lifespan. Within these interdependent relationships, communication plays a key role in regulation, change, and the definition of the family's present reality.	Principle		(Segrin & Flora, 2011).
<u>Pressure to buy a better child</u>	If identity formation is less effective it can be a source of problematic psychosocial development in later years. However, if an individual transitions to emerging adulthood coming from a balanced, functional family foundation they will reasonably have the self-esteem and fortitude to embark on the exploration necessary for crucial identity formation.	Principle		THE IMPACT OF FAMILY FUNCTION ON IDENTITY FC ADULTHOOD (Wallace) https://wakespace.lib.wfu.edu/bitstream/handle/103 :

Aa Cluster	Property	Tags	Factor theme	Source
<u>Pressure to buy a better child</u>	Parenthood takes a significant amount of time, energy and resources both for moms and dads. But why might fatherhood be particularly isolating? "When women become parents, our friendships are woven into our parenting and our parenting is woven into our friendships," she wrote. "Male friendships, on the other hand, have historically been built around time away from the kids." More pressure now to be a good dad is leading to high levels of stress and the feeling of isolation in men.	Development		ipsos what the future https://future.ipsos.com/gende-support-the-changing-role-of-men
<u>Pressure to buy a better child</u>	Robotics, Artificial Intelligence and Technology Convergence drive forward Development – while Employers lag behind, experts anticipate a globally rising unemployment rate with a continual rise up to 24 percent by 2050.	Development		https://www.bertelsmann-stiftung.de/fileadmin/files/BSt/Publikationen/GrauePi 2050: The Future of Work. Findings of an International Project.
<u>Pressure to buy a better child</u>	Parents want their children to be as healthy as possible.	Principle	Parenthood	Zuijderland Next Nature
<u>Pressure to buy a better child</u>	The clinic will be like a [genetic] restaurant; you can go to an expensive restaurant and get caviar and truffle and you can go to a less fancier restaurant where you cannot. It depends on how much you can afford and how much you want.	Principle		Feng Zhang - member of the core faculty at the Broad

Aa Cluster	≡ Property	≡ Tags	≡ Factor theme	≡ Source
<u>Pressure to buy a better child</u>	by 2050, prospective parents could pay to select not only for good health but for traits such as intelligence, attractiveness or athleticism – the babies of rich parents could be genetically superior to those born to lower-income familie	Development		the guardian https://www.theguardian.com/lifeandstyle/2019/dec/carers-single-fathers
<u>Pressure to buy a better child</u>	We are encouraged to compare ourselves with others, and we are also becoming more perfectionist.	Trend		the guardian - Thomas Curran, a social psychologist https://www.theguardian.com/lifeandstyle/2019/dec/carers-single-fathers
<u>Pressure to buy a better child</u>	the fraction of the world living in extreme poverty and experiencing violence is decreasing; several technologies combined with earth shrinking and flattening could accelerate this trend.			George church
<u>Pressure to buy a better child</u>	Health equity are the conditions, resources, opportunities and power that allow one to achieve optimal health.	Principle		what the future https://future.ipsos.com/gender/what-the-future-of-binary-world
<u>Pressure to buy a better child</u>	There is a tendency to believe that technology has the power to fix all complex problems that society is facing, without having to change anything in the lifestyle of people. This idea supports the individuals in keeping their habits and practices as they are, thinking that no radical change in behaviour is necessary to fix world's problems since technology will solve the issues for them.	State		Reference: Pacala, S., & Socolow, R. (2004). Stabilizing a world of 9 billion people for the next 50 years with current technology

Aa Cluster	≡ Property	≡ Tags	≡ Factor theme	≡ Source
<u>Pressure to buy a better child</u>	Global climate is projected to continue to change over this century and beyond. Temperatures will continue to rise, frost-free seasons will occur, more droughts and heat waves, hurricanes will become stronger and more intense, sea level will rise by 1-8 feet by 2100 and more effects that scientists predict will be results of global climate change.		Family	
<u>Species intertwined</u>	Het antropoceen hoeft niet alleen de ondergang van eerder geëvolueerde soorten te betekenen, er kan ook ruimte ontstaan voor nieuwe nog te evolueren organismen.	Principle		Koert van Mensvoort Next Nature
<u>Species intertwined</u>	Homo-evoluties will be a species that not only controls its won evolution but that of, bacteria, viruses animals and other species.	Development		juan eriquez - ted talk- will our kids be a different spe
<u>Species intertwined</u>	De technosfeer word bevolkt door een diversiteit aan dingen (computervirussen, robots etc. die we op termijn misschien als soorten kunnen gaan herkennen.	Development	Evolution Technology	Koert van Mensvoort
<u>Species intertwined</u>	We are worried to modify their genetic material. But mother nature does this everyday. That's how we become who we are today in the evolution. It's not something we do against nature, it just speeds up the process that nature's already doing.	Principle	Reproduction Society	Greely

Aa Cluster	≡ Property	≡ Tags	≡ Factor theme	≡ Source
<u>Species intertwined</u>	The interspecies barrier is falling as fast as the berlin wall did in 1989. not just occasional horizontal transfer but massive and intentional exchange - there is a global marketplace for genes.	Development		George church
<u>The whimsical aspects of reproduction</u>	"I think we know a lot more scientifically about love and the brain than we did a couple of decades ago, but I don't think it tells us very much that we didn't already know about love," Schwartz said. "It's kind of interesting, it's kind of fun [to study]. But do we think that makes us better at love, or helping people with love? Probably not much."	State		https://news.harvard.edu/gazette/story/2018/02/science-study-of-love/
<u>The whimsical aspects of reproduction</u>	One thing that we are studying is a small but growing number of people who are meeting each other over the internet in order to have children together, without a romantic relationship. We don't know how that works out for them or for the children yet, but it's certainly happening.	Trend		the guardian https://www.theguardian.com/lifeandstyle/2018/may/14/wombs-robot-carers-single-fathers

Aa Cluster	≡ Property	≡ Tags	≡ Factor theme	≡ Source
<u>The whimsical aspects of reproduction</u>	<p>“Genetic similarities are either causing people to be in similar environments, or are just correlated with other things that are causing people to be in similar environments,” Domingue says. “Once you’re in those environments” — a certain college or neighborhood, say — “that’s where you find your partner.” But both Domingue and Lehmiller say that phenomenon may be changing, as old notions of dating are replaced by more fluid ones.</p>	Development		https://time.com/5553817/couples-who-look-alike/ T Domingue, an assistant professor at the Stanford Graduate School of Business, studied genetic similarity between spouses and friends.
<u>The whimsical aspects of reproduction</u>	<p>And while some experts have pointed out that dating app filters that allow people to sort by race or religion enforce biases and homogeneity, other research suggests that online dating has overall led to more diverse couples.</p>	Trend		TIME
<u>The whimsical aspects of reproduction</u>	<p>“Attraction is this very complex phenomenon, and there are so many factors that play a role in it,” he says. “Initial similarity might lead you to be attracted to somebody, but it doesn’t mean you’ll have a happy relationship. Attraction is not something that’s easy to predict.”</p>	Principle		https://time.com/5553817/couples-who-look-alike/ T

Aa Cluster	≡ Property	≡ Tags	≡ Factor theme	≡ Source
<u>The whimsical aspects of reproduction</u>	Research shows people are not seeking shared similarity on one or two particular topics. "People are more similar than chance on almost everything we measure, and they are especially similar on the things that matter most to them personally," Bahns said.	Principle		Similarity in relationships as niche construction: Choi in a free choice environment. Bahns AJ1, Crandall CS https://www.ncbi.nlm.nih.gov/pubmed/26828831
<u>The whimsical aspects of reproduction</u>	For example, women are attracted to men with power and money because society limits their own ability to gain power and money. If, tomorrow, most positions of power and money go to women, then a man's status and wealth will matter much less to women, while male beauty, youth, and stamina may come to matter more.	Development		https://www.psychologytoday.com/us/blog/insight-tt-we-select-life-partner
<u>The whimsical aspects of reproduction</u>	The final selection among all the worthy candidates—is decided by a subjective internal process that is obscure and whimsical and does not necessarily obey the dictates of rationality, evolutionary mandates, cultural pressures, or even our own conscious will, plans or intentions. At the end of the day, as the philosopher Blaise Pascal said, the heart has reasons that reason doesn't understand.	State		https://www.psychologytoday.com/us/blog/insight-tt-we-select-life-partner

Aa Cluster	Property	Tags	Factor theme	Source
<u>The new pregnancy.</u>	The man would be given a uterus of his own. Or her own, since the first uterine transplants to enable "male" pregnancy will most likely be performed on transgender people. Currently, gender-change therapy (culminating in gender reassignment surgery) can provide a man with a body that looks and feels female, with lactating breasts, even a "neoclitoris" reconstructed from penile tissue and enabling orgasm.	Development		https://geneticliteracyproject.org/2018/01/05/male-p
<u>The new of pregnancy.</u>	Now, a good mother is someone who puts everything aside to offer the child the best possible future. The good mother of the future goes to the laboratory to select the embryo with the best biological chances.	Development	Family Motherhood	Philosopher Marcel Zuijderland in interview 16/03/18
<u>The new pregnancy.</u>	Reproduction is especially associated with deep emotional and visceral responses, it is symbolic and so meaningful. It is also really closely related to people's ideas about 'naturalness'.	State	Reproduction Society Symbolic meaning Technology	Smadjaor Next Nature
<u>The new pregnancy.</u>	Although anthropologists have long contested the culturally constructed nature of bonding theory (Ivry, forthcoming; Scheper-Hughes, 1992, Weiss, 1994), we have the assumption that "normal" women form close, loving attachments to their children in utero and immediately after birth, unless there is some psychological factor inhibiting the process, such as depression, or lack of social support.	State		<i>Teman, T (2018). The social construction of surrogacy of the psychosocial scholarship on surrogate mother 67, Issue 7 p.1106</i>

Aa Cluster	≡ Property	≡ Tags	≡ Factor theme	≡ Source
<u>The new pregnancy.</u>	Women with a very narrow pelvis would not have survived birth 100 years ago. They do now and pass on their genes encoding for a narrow pelvis to their daughters." "Without modern medical intervention such problems often were lethal and this is, from an evolutionary perspective, selection.	Development	Evolution Genetics Reproduction pregnancy	https://www.bbc.com/news/science-environment-38 department of theoretical biology at the University of
<u>The new pregnancy.</u>	Pregnant women sometimes joke that their developing foetus feels like an energy-sapping parasite. In a sense it really is, and its energy demands grow with every passing day. some studies say the process leads to life-changing but non-lethal injuries in as many as 40% of cases. The price women pay for childbirth seems extraordinarily high. Childbirth became a distressingly painful and potentially lethal business	State	Reproduction pregnancy	BBC EARTH https://www.bbc.com/news/science-env
<u>The new pregnancy.</u>	Epigenetics — how our behaviors, such as diet, smoking and drinking — can affect our genes and how those changes can be passed on, make the idea of non-genetic inheritance possible.			https://time.com/3461485/how-previous-sexual-parl
<u>The new pregnancy.</u>	We need to think about the biological impact of reproduction on women's bodies. We should think of it as something that we have technological possibilities for findings solutions to.	Development	Womanhood	Smajdor Next Nature

Aa Cluster	≡ Property	≡ Tags	≡ Factor theme	≡ Source
<u>The new pregnancy</u>	In the past and to some degree still in the present, a woman's value was in her reproductive faculties in combination with her sexual attractiveness. the women's role is to reproduce. Of course , if you're a reproductive slave in society A society that relies on that will also strongly sanction those kind of roles to make it easier for everyone in society to accept that this idea is necessary and morally valuable in itself. This ideas are still extremely prevalent in our society and continue to be so for a very long time to come.	State	Gender roles Society Womanhood	Smadjor
<u>Towards a gender spectrum</u>	he farther our science goes, the more we have to admit to ourselves that these categories that we thought of as stable anatomical categories that mapped very simply to stable identity categories are a lot more fuzzy than we thought."	Development		https://time.com/3672297/future-gender-norms/
<u>Towards a gender spectrum</u>	The concept of gender roles is not cast as a biological phenomenon, but rather a psychological and socially constructed set of ideas that are malleable to change (Levant & Wilmer, 2011).	Principle		https://www.apa.org/pi/about/newsletter/2018/09/ha (Levant & Wilmer, 2011)
<u>Towards a gender spectrum</u>	When it comes to attitudes about gender roles, many men and women are in transition between the traditional ideas of the past and more egalitarian or equitable notions.	Development		promundo https://promundoglobal.org/resources/mexico/#

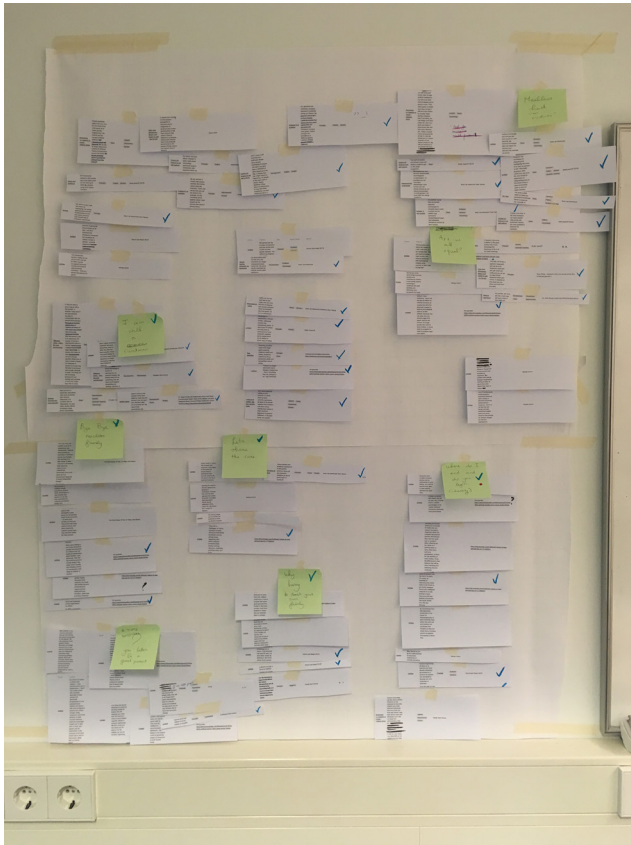
Cluster	Property	Tags	Factor theme	Source
Towards a gender spectrum	We as people, society and institutions will need to be responsive to the evolution and realities of people's lives to ensure that we and our systems value all people to their fullest human capacity and desires, and that they are treated with dignity and respect.	Principle State		
Towards a gender spectrum	Perhaps it sounds utopian, but the end result may be a world where kids on the schoolyard don't have to worry so much about whether or where they fit. In a world beyond binaries, there's a place for everyone. And if there's no category for you, you make one.	Development		https://psmag.com/ideas/gen-z-the-future-is-non-bi
Towards a gender spectrum	Postgenderism is the idea that gender in humans should be voluntary, and that we should rely on advanced technology to replace it. Postgenderists argue that the abolishment of gender would, in fact, be freeing, and would rid society of traditional gender roles and expectations that are largely detrimental to society.			https://curiosity.com/topics/what-would-a-post-gen
Towards a gender spectrum	Central to the crisis resolution process is achieving the balance between the need to be a unique individual, contrasted with the need to achieve a sense of belonging and relatedness to those who are significant to the adolescent. This can be summed as the balance between independent individual identity and dependent social identity (Adams; Kleiber).	Principle		Adams, G. R., Berzonsky, M. D., & Keating, L. (2006). <i>university students: The role of identity processes an and Adolescence</i> , 35(1), 81-91. https://scholarsarchive.byu.edu/etd/article=3548&context=etd

Aa Cluster	≡ Property	≡ Tags	≡ Factor theme	≡ Source
<u>Towards a gender spectrum</u>	Beyond the power dynamics, there's a level of comfort in well-worn identities. "It's easy to sit in these old roles that we've watched and to feel a certain comfort in their stability in a world that feels kind of hard to understand," Barker said.	Principle State		https://time.com/3672297/future-gender-norms/
<u>Towards a gender spectrum</u>	It is very difficult finding evidence that would indicate just how much of sex differences are due to society vs. genetics. A truly mature, honest, and nuanced discussion of the origins of sex differences must recognize the deep influence of genetics and biology [8]. That doesn't mean that we ignore sociocultural factors, which are clearly important. But sex differences in behavior are so pervasive in nearly every other species. It's just not plausible that somehow male and female psychology evolved to be identical despite the physiological differences and different reproductive roles across human evolutionary history.	State		https://blogs.scientificamerican.com/beautiful-minds-seriously/

Aa Cluster	≡ Property	≡ Tags	≡ Factor theme	≡ Source
<u>Towards a gender spectrum</u>	It's not harsher gender socialization by parents and media, stringent societal gender roles, or institutional sociopolitical forces that widen the differences between men and women in the most progressive nations in the world. When you treat everyone the same, as in the Nordic countries, it's only genetic predispositions that produce the most observable individual differences. Extremes of sexual freedom beget larger psychological sex differences. Or as explained by Israeli psychologists Shalom Schwartz and Tammy Rubel-Lifshitz, it may be that having fewer gendered restrictions in a culture allows "both sexes to pursue more freely the values they inherently care about more."	Principle		<i>psychology today - the truth about sex differences</i> D November 7, 2017 https://www.psychologytoday.com/sex-differences
<u>Unity in diversity</u>	Genome engineering will allow us to become ever more diverse, enhancing our prospects of survival. For species that are lowest in diversity are most vulnerable to extinction.	Principle	Evolution Genetics	Church and Regis (2012)

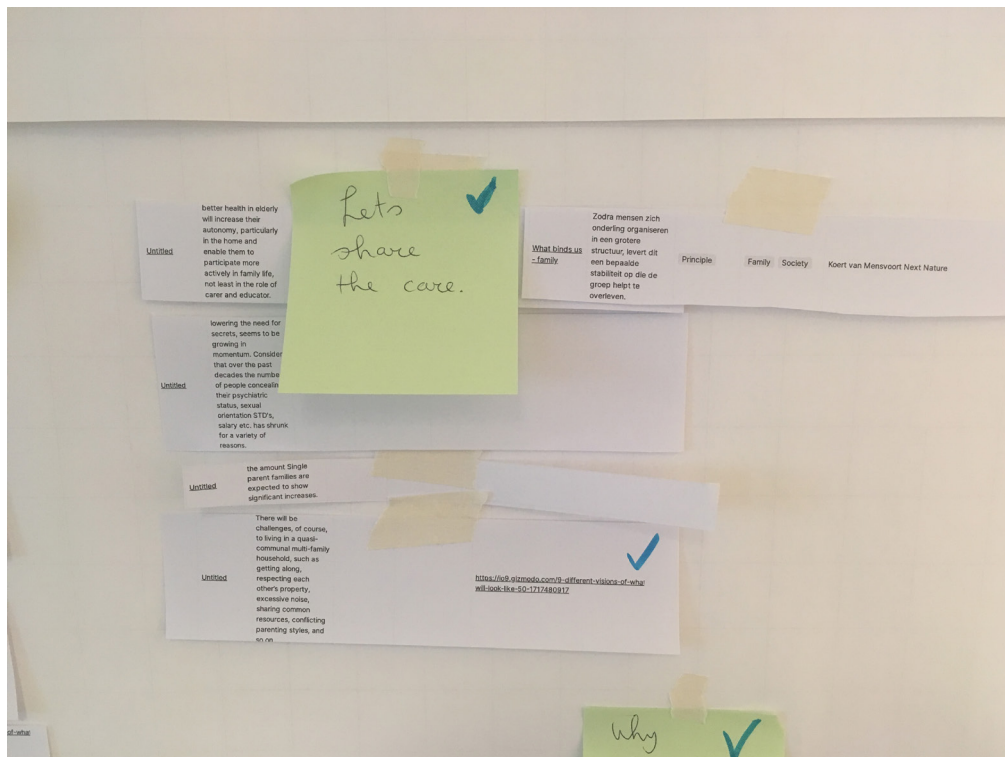
Cluster	Property	Tags	Factor theme	Source
<u>Unity in diversity</u>	you will know your family traits through artificial intelligence. And if you want, you can design your baby a little bit. Like if you want your baby to have brown hair with blue eyes, tall/short, etc. Today it sounds crazy but people will accept it. Just like people go to a plastic surgeon, or buy dietary products. We will not announce it, but people will want it. Very soon, you will have a list of what you can do.	Development	CRISPR Technology Family	
<u>Unity in diversity</u>	Over veranderen van persoonlijkheid: " het gaat eigenlijk allemaal dezelfde kant op, iedereen wil iets vriendelijker, gewetensvoller, georganiseerder en iets stabielier zijn, iedereen wil dezelfde kant op evolueren.	State		Ondertussen in de kosmos; kan je van karakter veranderen & tony kudde
<u>Unity in diversity</u>	Earth's atmosphere shields life on the ground from cosmic radiation that can damage DNA. Astronauts in space have no such protection, and that puts them at risk. An investigation on the International Space Station examines DNA damage and repair (using CRISPR-9) in space in order to help protect the long-term health of space travelers. NASA	Development	CRISPR Genetics	NASA https://www.nasa.gov/mission_pages/station/rpace/
<u>Where do I end and you begin</u>	Lowering the need for secrets, seems to be growing in momentum. Consider that over the past decades the number of people concealing their psychiatric status, sexual orientation STD's, salary etc. has shrunk for a variety of reasons.	Trend		George church

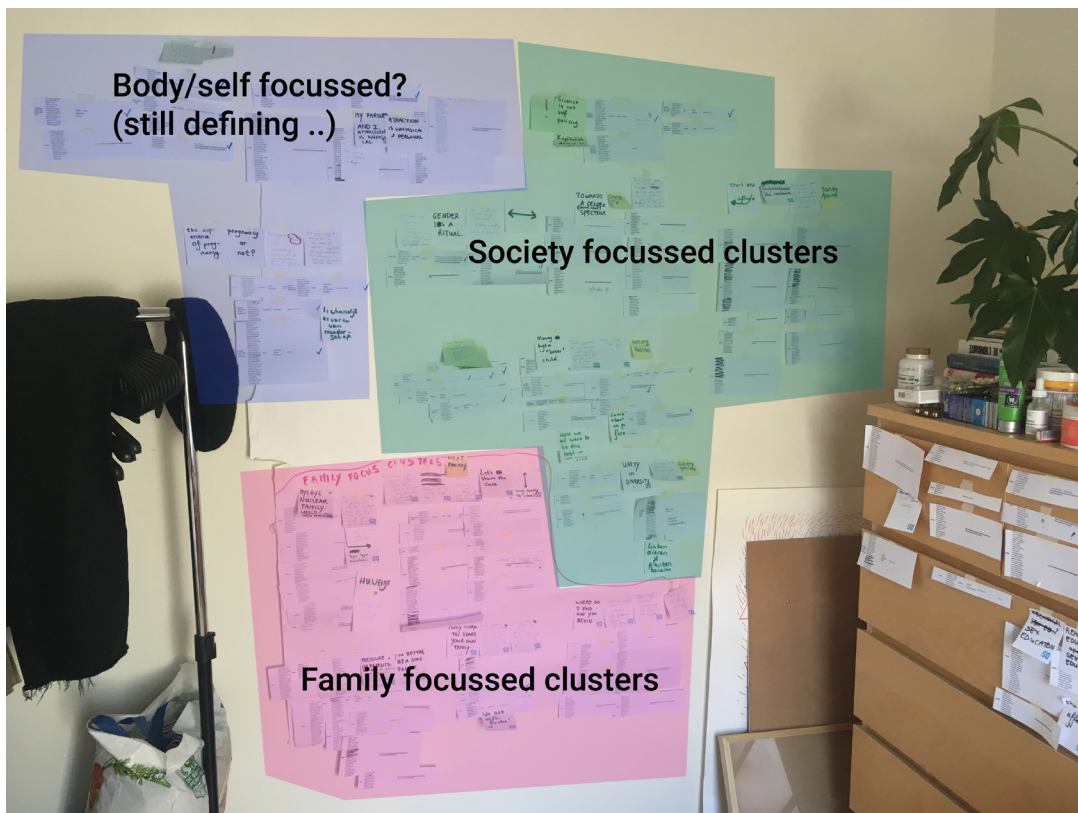
C. Clustering context factors



Looking for the relations between context factors. Each green post-it represents a possible cluster.

Clustering means a lot of swapping clusters and playing around until the final clusters are achieved.





Looking for overarching structure

D. Worldview: a story

What will 2050 look like based on my research?

The worldview is a summary based on the clusters. It is not an absolute truth but a carefully shaped view by me. It does not present a utopic or distopic view but tries to tie the clusters together in a story.

If we look at the western world, in 2050 the **capitalist system based on free market principles** is probably not that different from what we see nowadays.

Higher pressures due to, higher unemployment rates (*Futures Impact, Daheim, Wintermann 2016*), global environmental issues becoming more prominent in our daily lives and more and more individuals experiencing depleting resources, **the world will face many new challenges by 2050** (*NASA, 2020*) (*cluster B*). The way we deal with these challenges is by focusing more on ourselves and how we can assure a safe spot in a world that becomes more volatile, uncertain, complex and ambiguous. A development like this will make **the world we know even more competitive.**

If we look at reproductive technology, a group of people is definitely willing to accept new reproductive technologies like, genetic engineering. Some families might have higher access to genetic engineering than others and are willing to do so based on the pressures they feel (*cluster B*). **Radical reproductive technology could easily widen the gap and make inequality bigger as designer babies and external wombs might initially be available for the rich only.** Quite a dystopia or not that different from the inequalities we face nowadays? Is the motivation behind sending your kids to the best private schools that different?

As altering one's child's DNA becomes socially acceptable the way we see our bodies will shift as well (*cluster F*). Why not **tweak our own bodies a bit as well?** This tweaking **ranges from improving our health to implementing specific traits from other species in order to turn ourselves into special purpose organisms adding a variety of bodily sensations to our experiences.**

Being able to manage reproduction on a level like never before, does not mean we are willing to do so, by 2050 our **primal instincts will still be what drives us** (*cluster E*). Reproduction remains something

natural and even magical, something that feels bigger than ourselves even as radical reproductive technology technology eliminates the connection between attraction and reproduction. We will probably still want to reproduce with the person or people we choose as life partners.

The technological and cold climate we experience in hospitals and clinics does not relate to the urges and drives we feel when it comes to reproduction, **as even by 2050 these technologies are still at an early stage if they want to reach a big audience they have to be carefully designed with human needs in mind.**

As by 2050 ectogenesis could be introduced by the artificial womb, reproduction does not rely on gender anymore (woman carrying babies). This **disconnection from pregnancy** (cluster F) goes hand in hand with **more room to view gender as a spectrum** (cluster D). On a social level this means among others more room for people to express whom they are outside of the stereotypical gender roles, to have relationships with whom they desire to, to have genetic offspring of both partners while being in a same sex relationship (same sex reproduction). These changes could shake up society on such a level we will start to ask the question; what actually is gender? And what do we want family to be? With more varied families **a new focus on family values and the quality of relationships within them could emerge, eventually leading to more interconnected and intimate communities** (cluster A).

Not only will families change based on new structures and more gender freedom, age will also play a role. As scientist are able to reverse and maybe even stop the process of aging **we could easily see first time parents who are well in their 50's and 60's.** (cluster B) Why hurry to reproduce if you can experience multiple adventures and careers first?

By 2050 most people will still either be biologically male or female. Gender has been a script acted out for centuries and thus is embedded within all layers of our society, changes will be met with resistance. **A battle around gender between traditionalists and early adopters will probably emerge.**

Take the abortion right, today almost all European countries allow abortion on request or on broad social grounds (reproductiverights.org). A recent abortion ban by the court in Poland however shows that reproductive rights can change rapidly with changes in political climate.

Resistance to changes around gender (cluster D) and **discussions around reproductive rights will by 2050 definitely be present as governments try to figure out how to deal with the biotechnological revolution** (Cluster C).

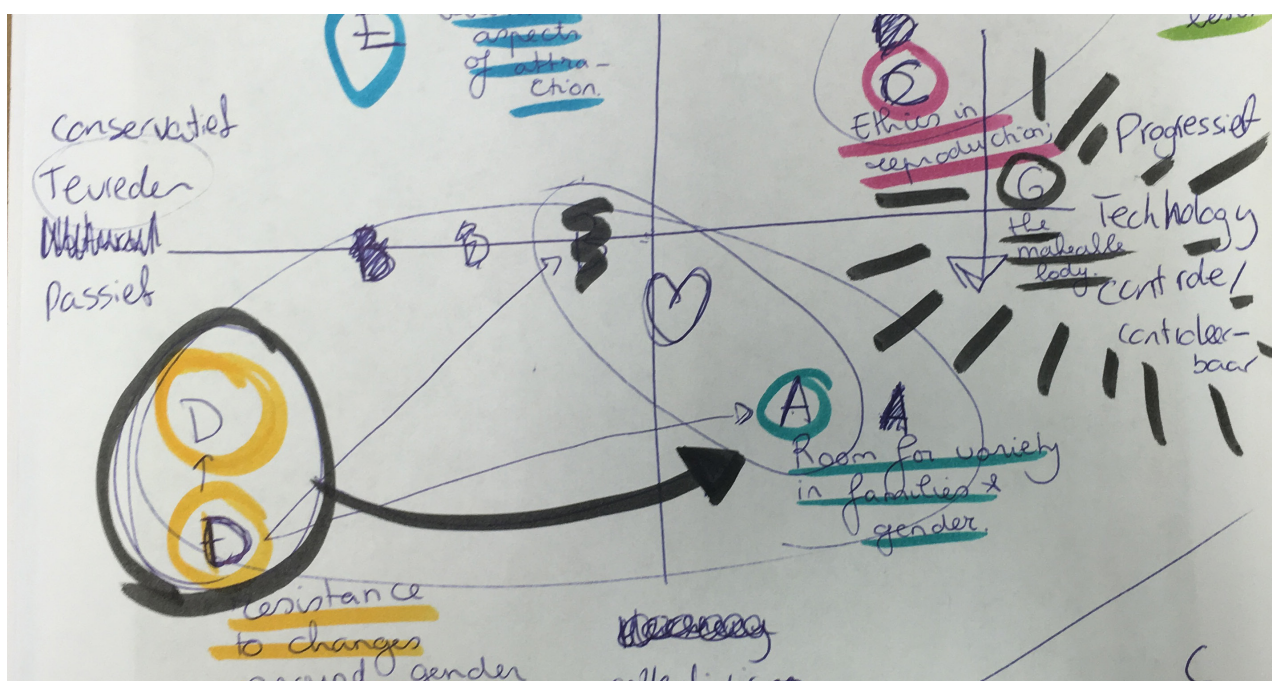
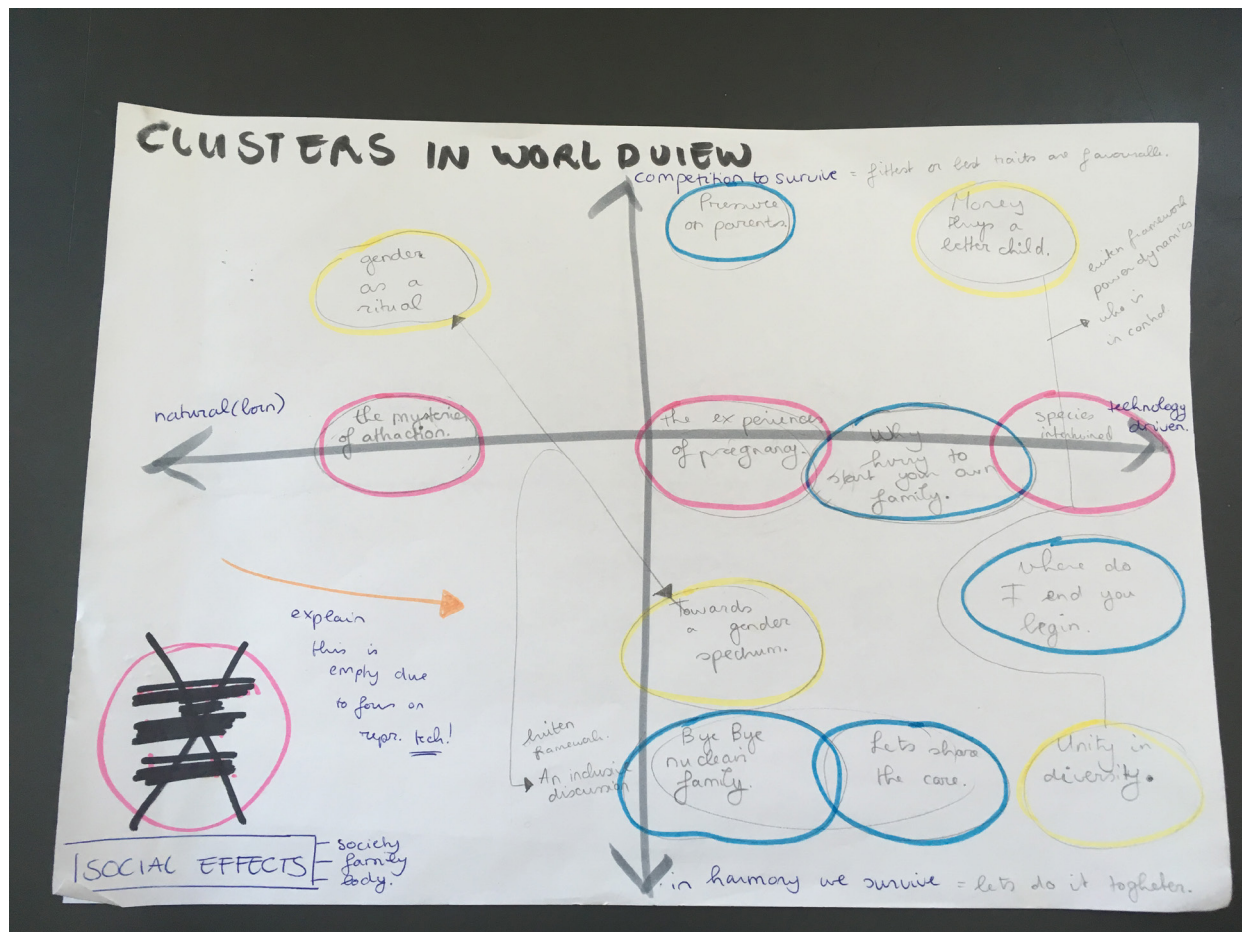
As governments struggle with reproductive rights, another question is whether they are able to create policy that dictates the freedoms and limits on DNA editing which becomes more accessible by the day.

As our power as species lies in unity in diversity, will DNA editing take the randomness out of reproduction and drive diversity into the ground? Leaving us as species more vulnerable and homogenous?

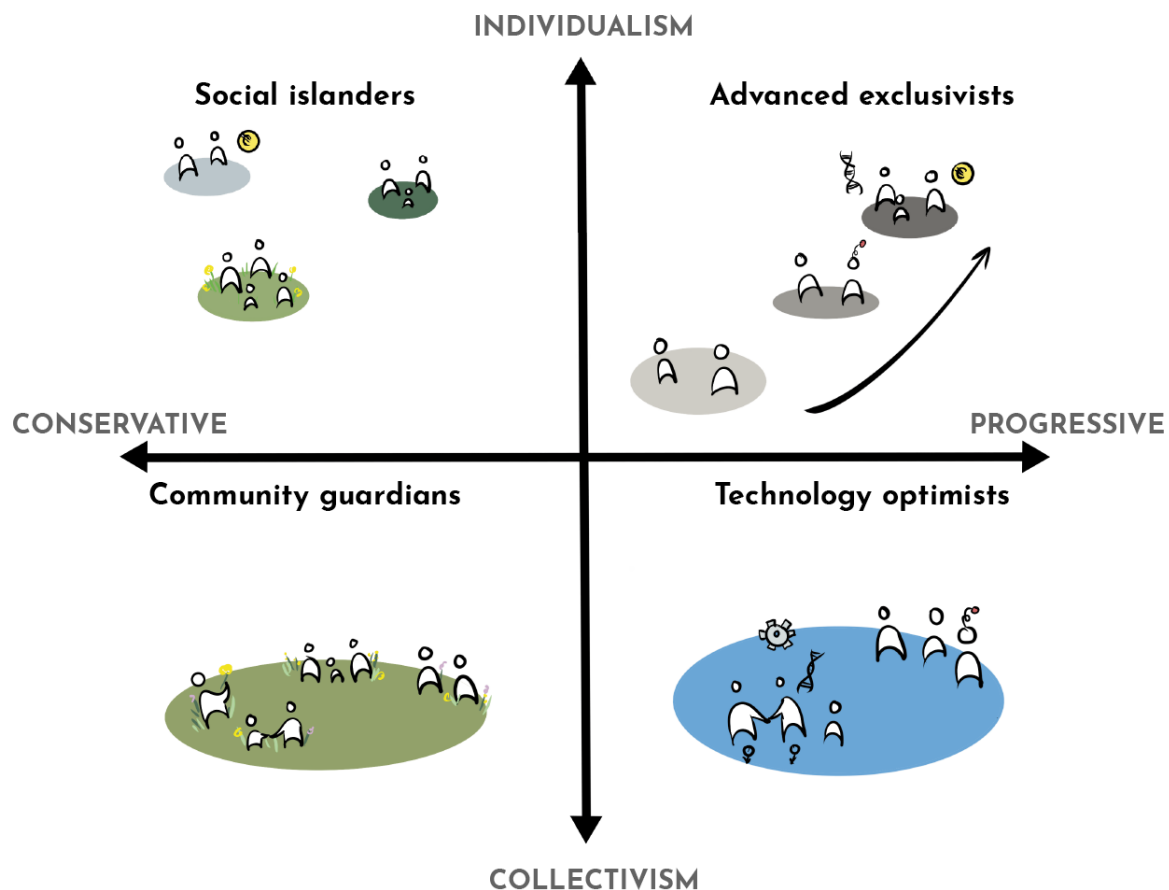
I present a world starting to figure out how much we are willing to use technology in reproduction in order to evolve evolution itself and slowly coming to terms with both the opportunities and threats radical reproductive technology imposes on our society.

E. Framework creation

Creating possible frameworks on paper.



Alternative framework that was created focussed on society types.



Social islanders

- Advanced reproductive technologies are for the few whom are willing to pay, remain a taboo and are not spoken about.
- A competitive society which values the natural and old ways of doing things in which people with the same backgrounds stick to the same groups.

Community guardians

- Advanced reproductive technology are accepted to solely solve reproductive health issues in males and females as long as it is not in fight with natural believes.
- Natural, non hierarchical society which values togetherness.

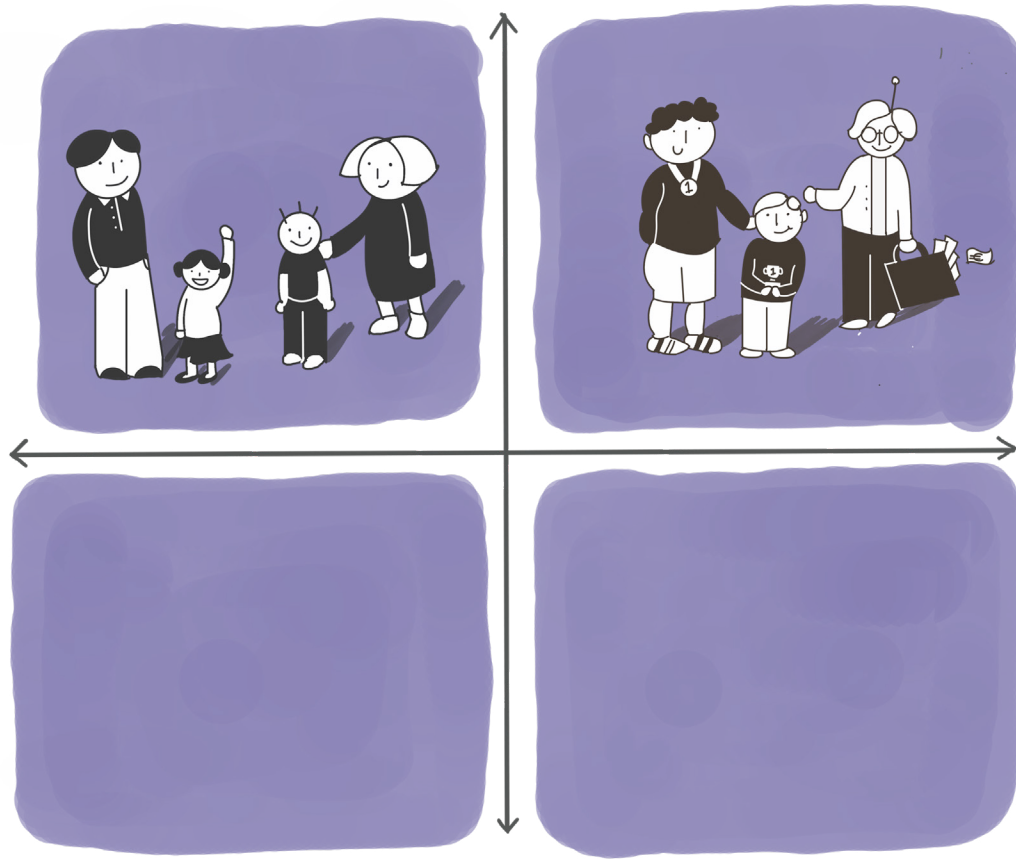
Advanced Exclusivists

- Advanced reproductive technologies are available for everyone be it on different levels according to whom can afford more luxurious and advanced options. They are used to control and advance every aspect of reproduction and maybe even society.
- A competitive and bottom down society with a "Look at us" mentality of people in power

Technology optimists

- Advanced reproductive technology is seen as something that helps and advances the task of childbirth and reproduction . The process is gender neutral and is made accessible for all.
- Open and transparent society , which values sharing of knowledge with a high willingness to experiment

Alternative framework that was created focussed on family types.



The nuclear family (One happy family)

- Father, mother and children
- Clear tasks and expectations based on gender stereotypes
- One happy family
- Strong believe in the family as a household that is exclusive

The family as a tribe (We share the care)

- Families with multiple family members involved, grandfathers, aunts etc. in close networks
- To be part of a tribe is to accept how the people before you have lived for ages
- Strong believe in naturalness and raising children together

The 'best' family (Look at us)

- Reproductive advancements in family lines, pressure to be better or at least 'as good' as previous generations
- Multi-generational success is of importance
- Raising specialty children with the use of among others AI, raising children is like training them

The family experiment (Everyone is accepted)

- Family is not necessarily about shared DNA or family lines
- Parenting is a shared activity and can be experimented with; openness to different caretakers and family structures
- New styles of communication within experimental family structures

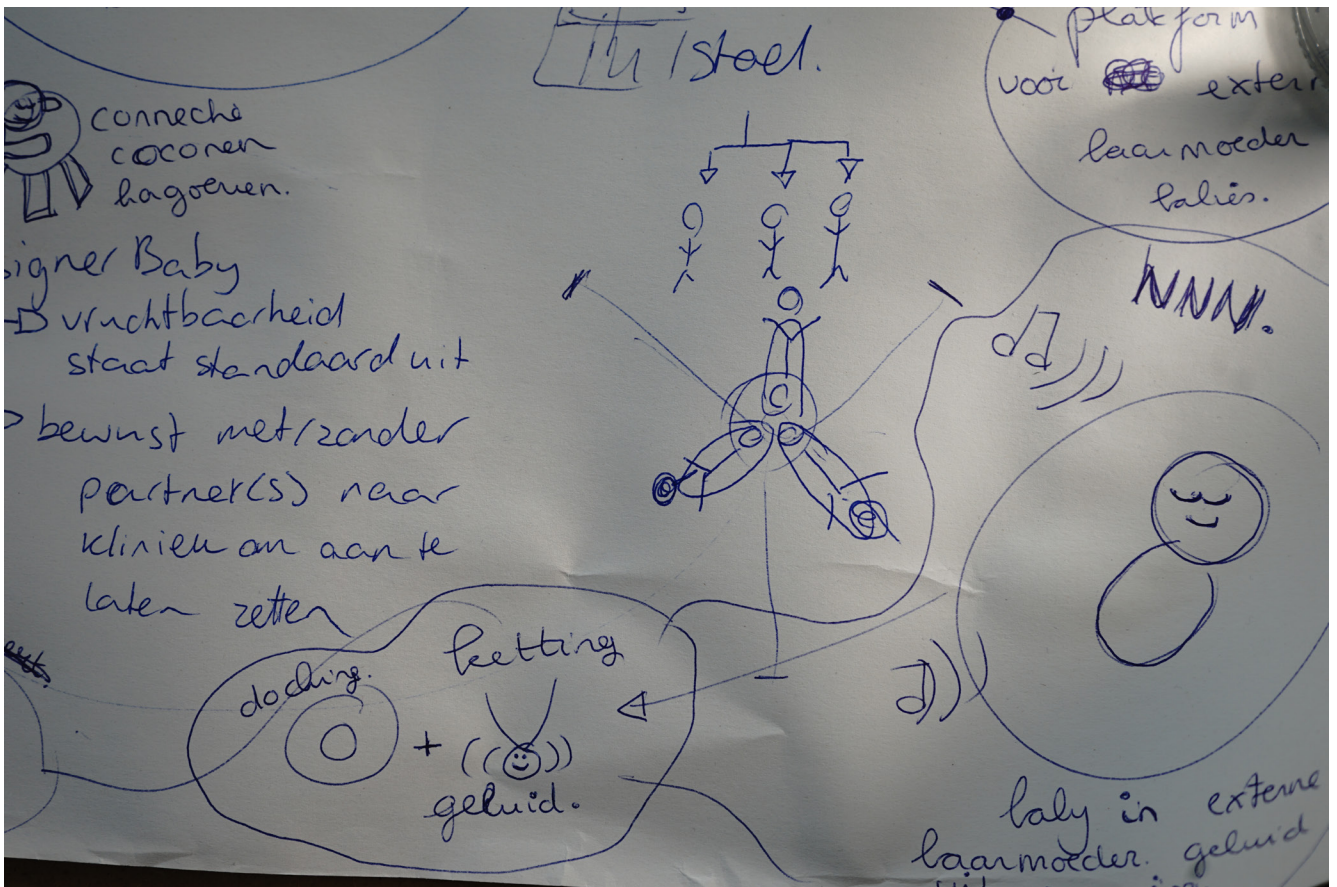
F. Ideation

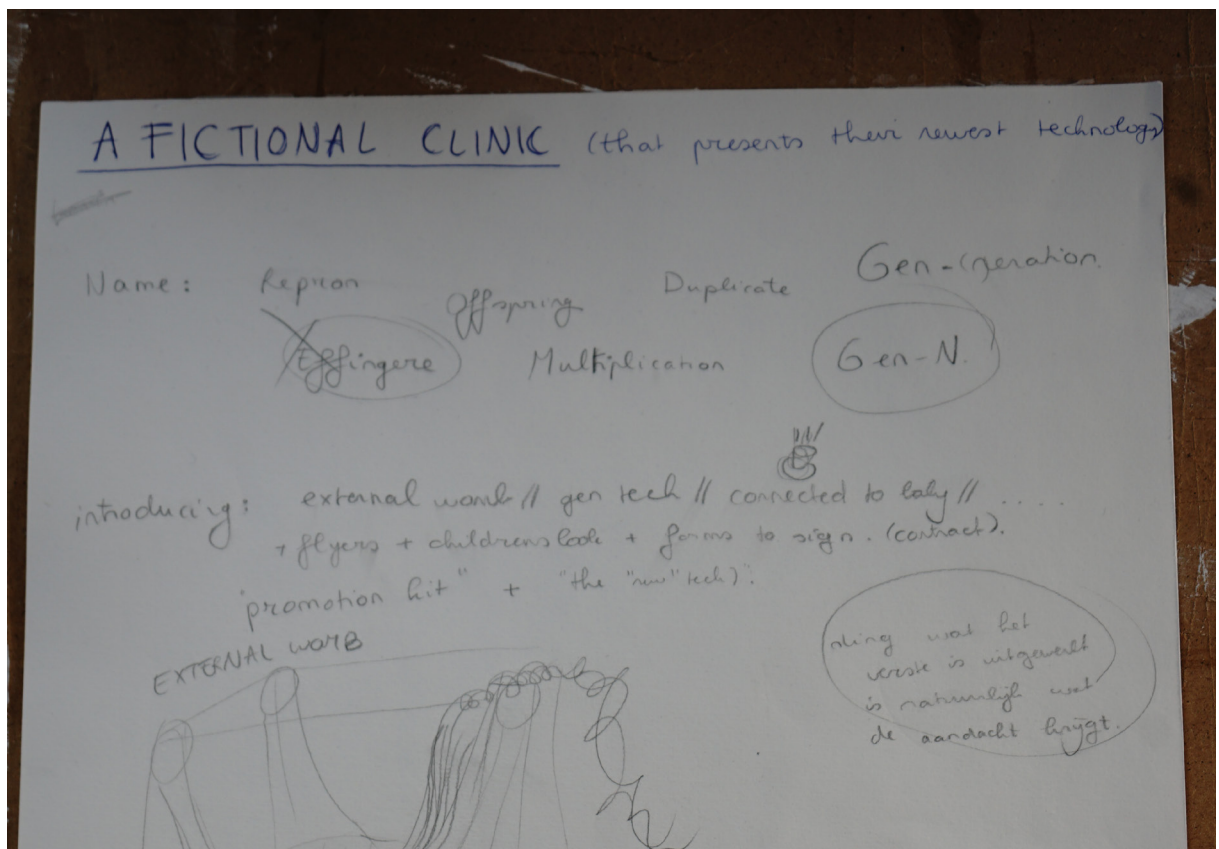
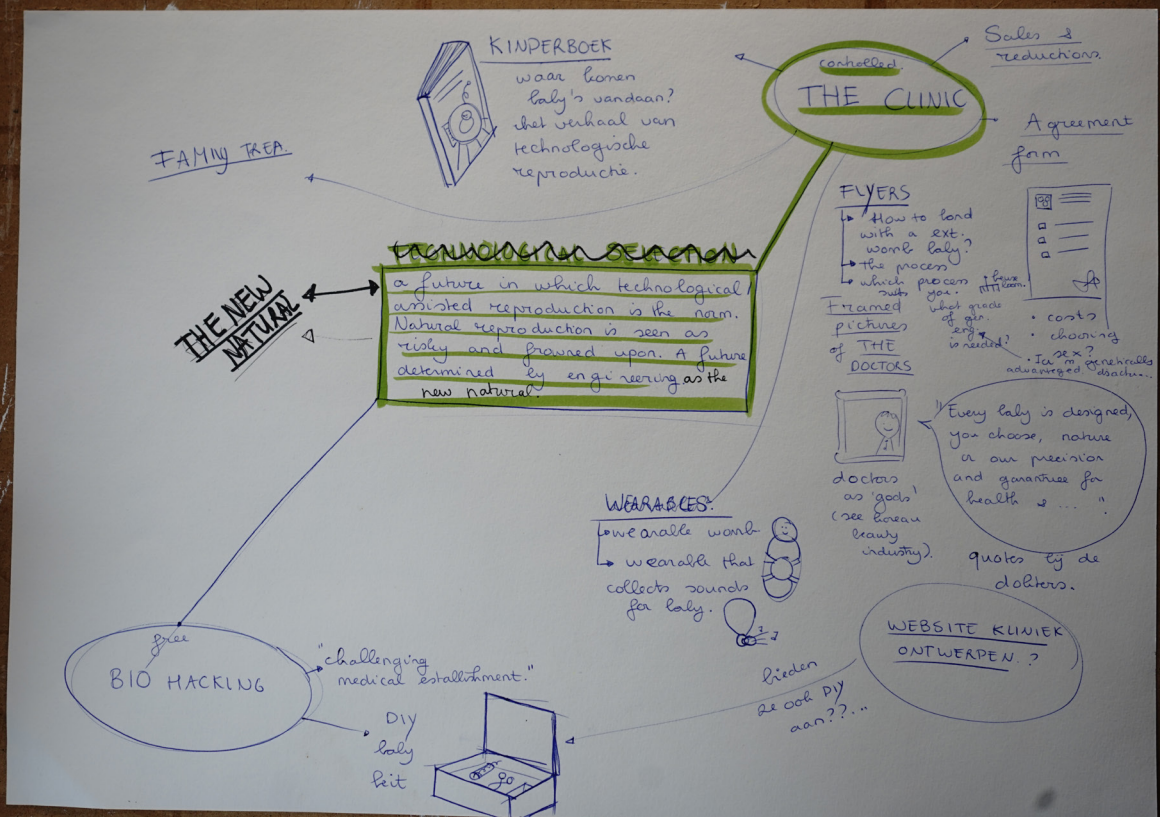
Ideation session fellow students

Goal	Create open mind edness after a ViP deep dive in the context and enable exploration
Role	Facilitator
Participants	Two recent Dfl graduee's (experienced brainstormers)
Method	Classic brainstorming and conversation

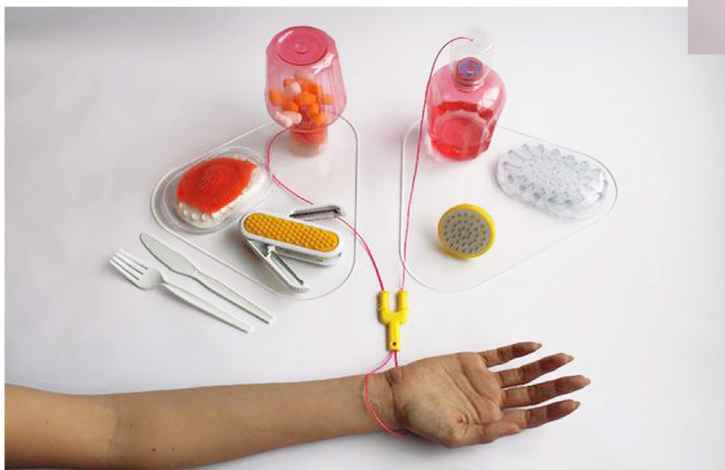
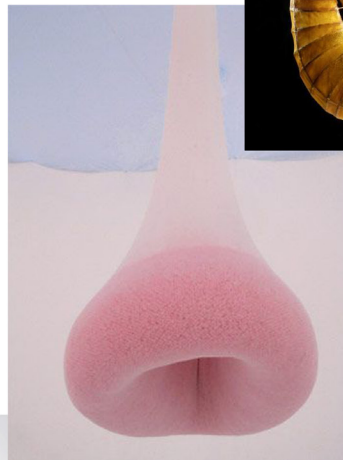
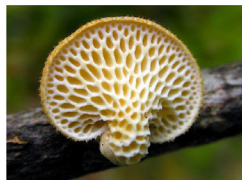
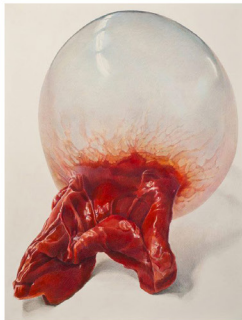
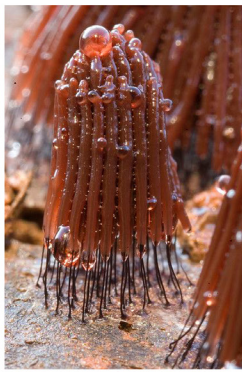
This brainstorm was conducted based on one of the older versions of the framework, although this does not make it useless, the idea's from this session were not part of the final concept.

Participants were asked to envision a future based on the tension field seen in [appendix D](#) and think about possible products or services. As in a classic brainstorming session a paper was on the table and the participants were invited to draw and write while also being in conversation. As facilitator I steered the conversation and wrote down their idea's, which are shown on the images on the following pages.



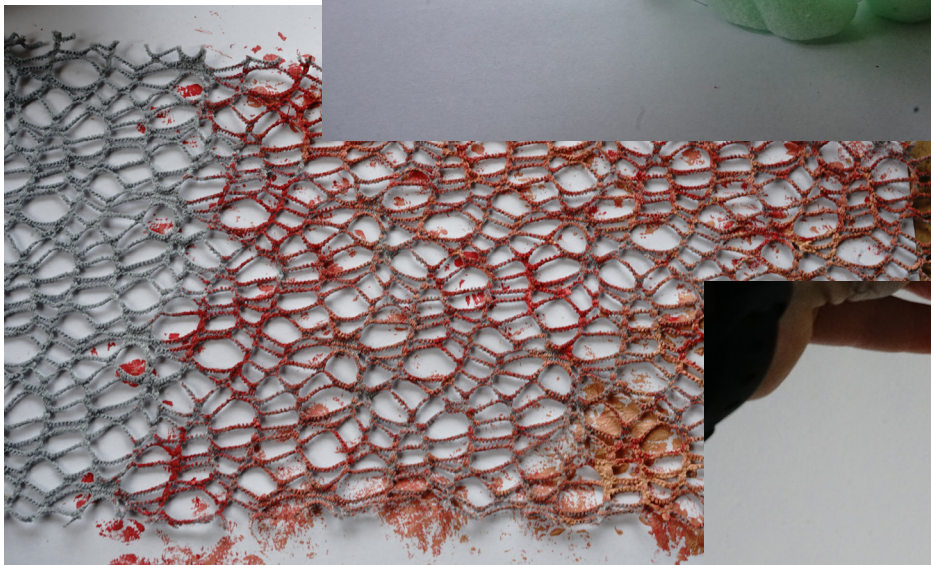


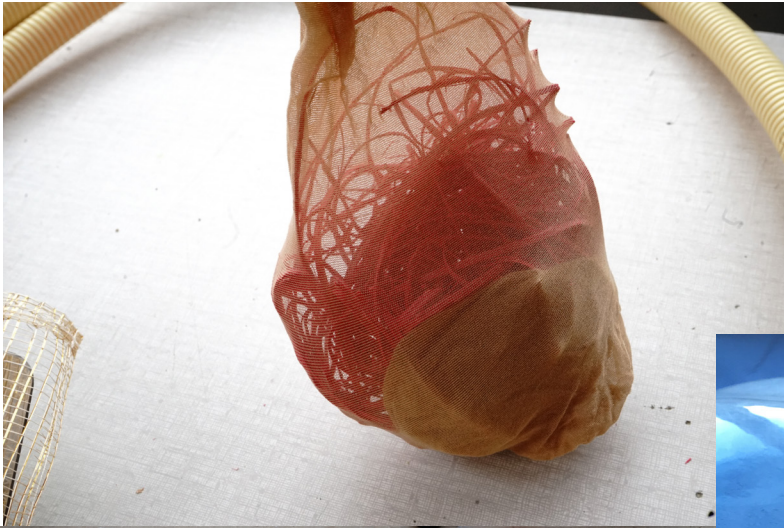
G. Collaging and sketching

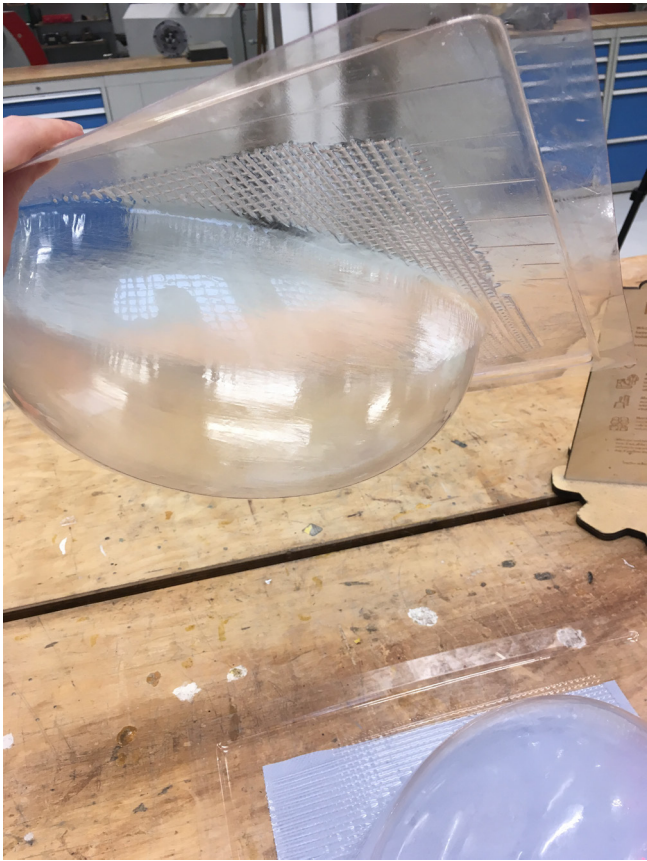


Within the collage searched for both inspiration from nature (other species) as well as the implementation of technological aspects (for example cables and tubes).

H. A selection of quick prototyping and building







I. Parent en doctor text

Older Couple - Joanna and Jules

Joanna: So many things turned out better than I hoped, I never thought that having children was still an option. Man I never thought that meeting Dave later in life was still an option!

Jules: Haha, thank god we did meet.

Jules: I am very grateful for our two girls, especially after thinking starting a family was not going to happen for me, I... we both spend a lot of time on our careers and family life was not a priority. I feel very secure and energetic now and have a lot of time to spend with my family.

Joanna: I have to admit, ten years ago hearing about Ostara for the first time I was sceptical. If the body is not able to get pregnant anymore, why start a family which is you know, pretty demanding. With the rate science extending life span, we have at least 50 healthy years left, so why not chase this dream and raise our girls with all the care and knowledge we have gained.

Two woman - Max, Ellis & Dr. Menuri

Max: pff where do I start, I feel very grateful and happy due to Ostara's external womb. I've had my ovaries removed because I was ill. It was necessary and saved my life but at the same time it was traumatic and gruelling. I never considered an external womb before, but I am glad we were still able to welcome Sophie into our family.

Ellis: The remarkable thing is, I did consider an external womb, even though there is no medical reason for me to do so. I feel absolutely no shame when I say I wanted to avoid the process of pregnancy. I have a fulfilling and demanding career as a dancer, pregnancy and the implications that come with it were not things I looked forward to.

Max: ah yes, your open mindedness to the womb machine as I call it, haha, definitely helped me. Honestly I had to overcome some mental hurdles, my body wasn't able to carry a child, but using a machine as a replacement, pffew that is something else.. I worried about bonding, would my body make the same happy hormones, would I feel like a mother without the process of pregnancy, would mothers who experienced pregnancy look down on me?

dr. Menuri: All very reasonable worries, we have implemented the external womb with a lot of extra care options, innovation that for the first time in human history puts growing a baby in technologies hands will come with worries and mental adjustment. Therefore the care we offer is more than just the womb 4.0 but we support new parents in the process of waiting for their child.

Ellis: oh yes I felt very supported! The day we got to take Sophie home was magical! For me there was just excitement, not a lot of fear, as we were well prepared and guided. Sophie is now taking her first steps, somehow that is far more scarier for me, I mean I constantly want to make sure she does not fall or hurt herself, haha.

Max: She is a quick walker, she did not even crawl, skipped that whole part haha, she just stood up, must be the dancer in her that she inherited from you.

Ellis: Oh yes she is definitely a dancer this one! I feel she has your academic abilities though, she is such a quick learner.

dr. Menuri: Ah, I remember you did not opt for genetic preferences and by just combining your DNA with the randomised algorithm option. I guess about half of our clients choose for this option nowadays, it is so heartwarming to see parents discover their children abilities as they grow.

3 fathers - Jonathan, Marc & Drew

Jonathan: A child with 3 fathers, it does not shock people that much anymore right?

Marc: Apart from the fanatics I would say, no. 8 years ago we would have made the news, now people are so more open minded. If we decide to be in this relationship, a child with all of our DNA just makes a lot of sense.

Jonathan: Yes, my grandparents still think we are mad for doing this, but they love Ralf anyway. It kind of makes sense that their generation needs more time to adjust, babies in machines, people in pressure tanks to heal, designing out heritable disease, biotechnology is developing so fast, sometimes it feels like we live in a real time experiment, new things are never without risks.

Drew: Oh yes that is definitely true! I also feel that they break their head the most over practical things though, like how are we going to make decisions between the three of us. And then there was the case of his looks, whom will he resemble most?

Marc: I am glad we decided that since we look pretty different from each other, for Ralf not to resemble any of us, we are truly unique and as a family our strength lies in being there for each other, spending time together.

dr. Menuri

Saying that the introduction of external womb technology has changed the fabric of our society is an understatement I believe. The biotechnological revolution has shaken up our view on natural processes over the past decades. Chances of suffering from genetic disease, obesity, mental disorders has gone down drastically. I feel very grateful to be a part of the reproductive field! God I sound very peppy hah!

No but seriously, I started working with Ostara 5 years ago and fellow scientist that discovered and developed our womb 4.0 technology are true innovators. Twenty years ago we were still dealing with a lot of social resistance around the external womb, even violent outbursts and protests! Back then the womb was accepted in being an option for woman struggling to get pregnant it took time for the broader acceptance we now see and I love that!

There is less pressure to fit a specific norm or have a certain age or degree of success in order to start a family I would go so far as saying that this is creating more equality.

J. Set up interviews

Interview Script Evaluatie

Thanks for participating in the evaluation of my graduation concept. The concept is an exhibit consisting of different elements based around a futuristic technology.

Because creating a real scale exhibit is not possible for this project a website was created that represents the exhibit. A floorplan represents the exhibit you are going to 'visit'. Please use your imagination and try to think about how you would feel and react were the exhibit real. After taking a look around I will ask you to fill and ask you some questions.

If anything is unclear please tell me!

When clicking through the exhibit, please start at the entrance and end at the exit.

Questionnaire - Characteristics - rank from 1-5

I thought the exhibit was: Believable (even though the technology does not exist yet I was willing to believe and able to recognise)

I thought the exhibit was: Weird (it made me confused and it felt uncanny)

I thought the exhibit was: Captivating (it was able to attract and hold my interest)

I thought the exhibit was: Mind-boggling (it was a lot of new information and some of it blew my mind)

I thought the exhibit was: Layered (information was presented in different ways that could be uncovered)

I thought the exhibit was: Challenging (it made me think)

I thought the exhibit was: Dull (it did not interest me or spark any feelings)

Interview questions - Statement - Overall feel

Overall feel

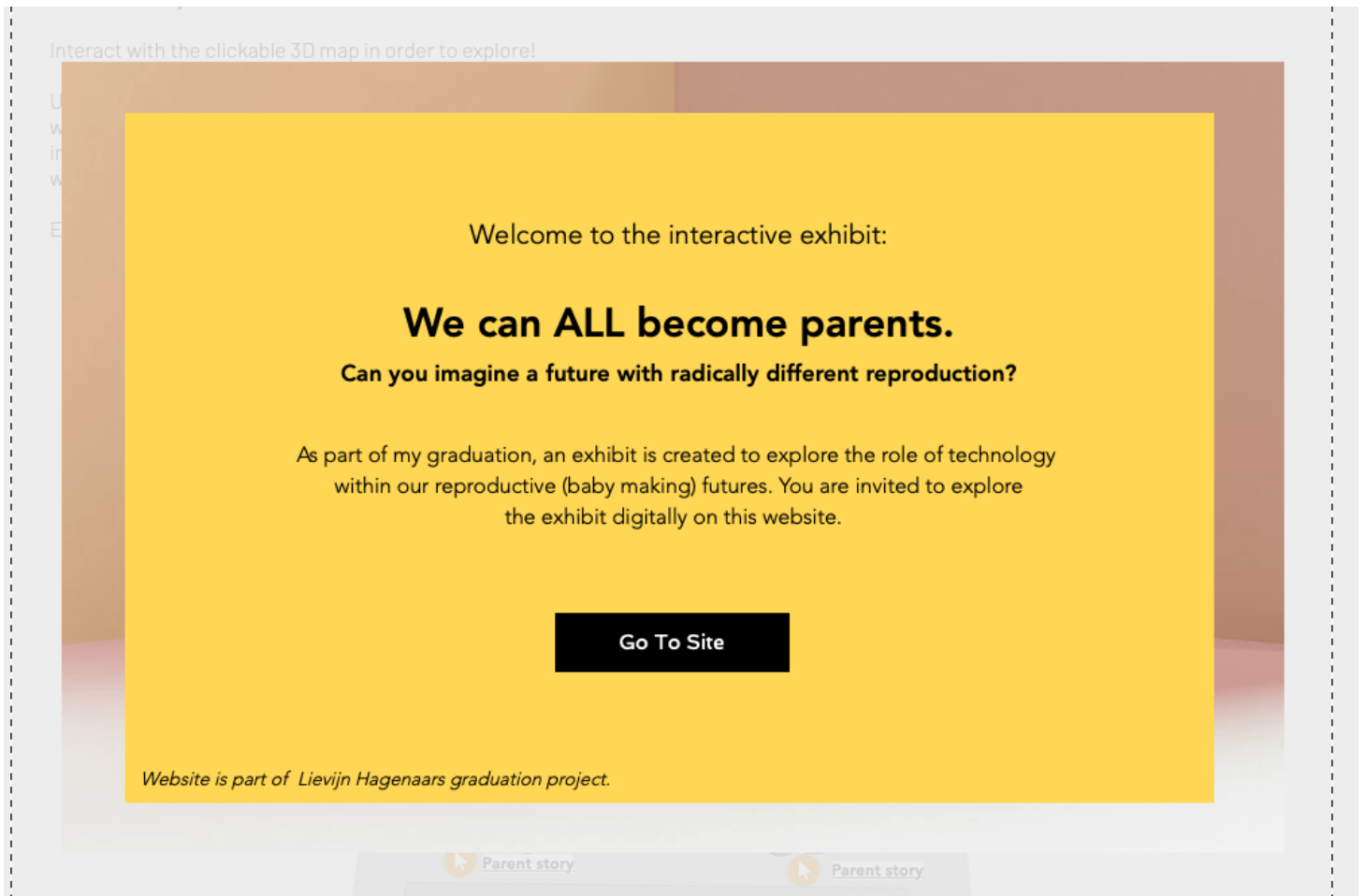
1. What was your overall impression/feeling of the exhibit?
2. Was there an element that surprised you or that you liked particularly?
3. Where there elements that were unclear or that did not make sense to you?

Statement

1. Can you tell me what you came across in this exhibit and what your thoughts were?
2. Can you explain the technology presented, the womb 4.0?
3. How do you feel about this technology? Is it something you think could happen?

(if they do not mention family types or their personal opinions or limits, ask why)

K. Website printscreens



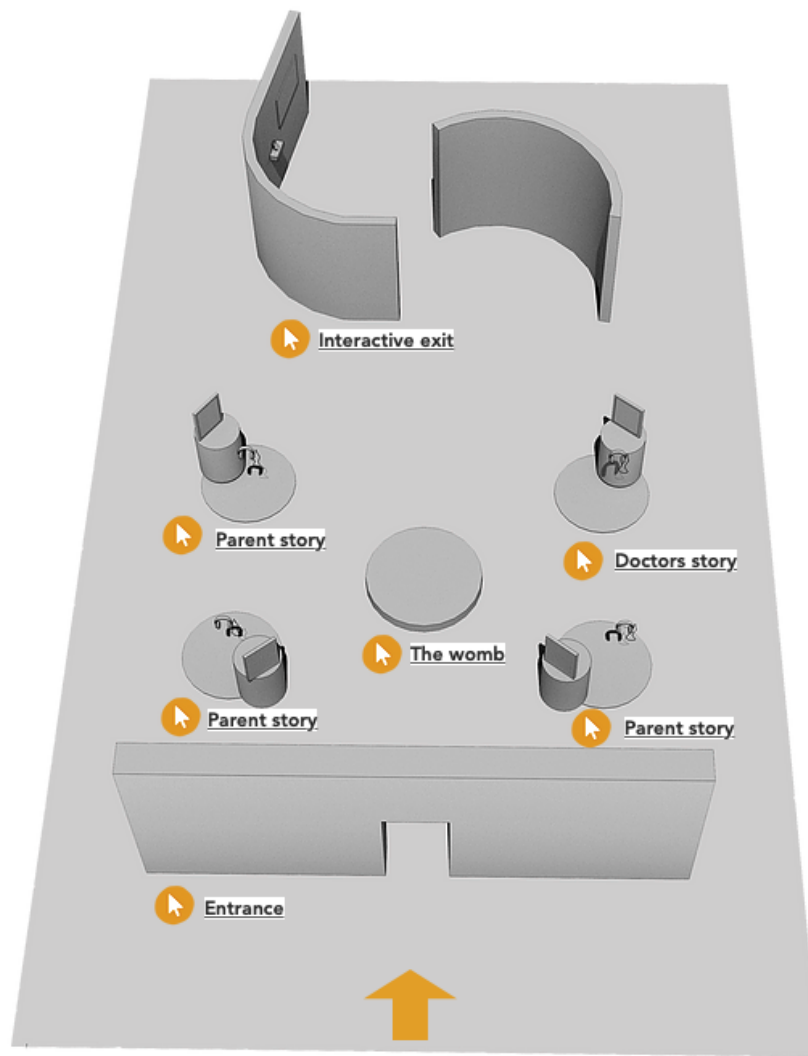
We can ALL become parents.

Can you imagine a future with radically different reproduction?

Interact with the clickable 3D map in order to explore!

Use your imagination and think about how this exhibit would make you feel if you were to visit it. Text, images and audio will guide you (please press the play buttons to start the audio).

Enjoy!

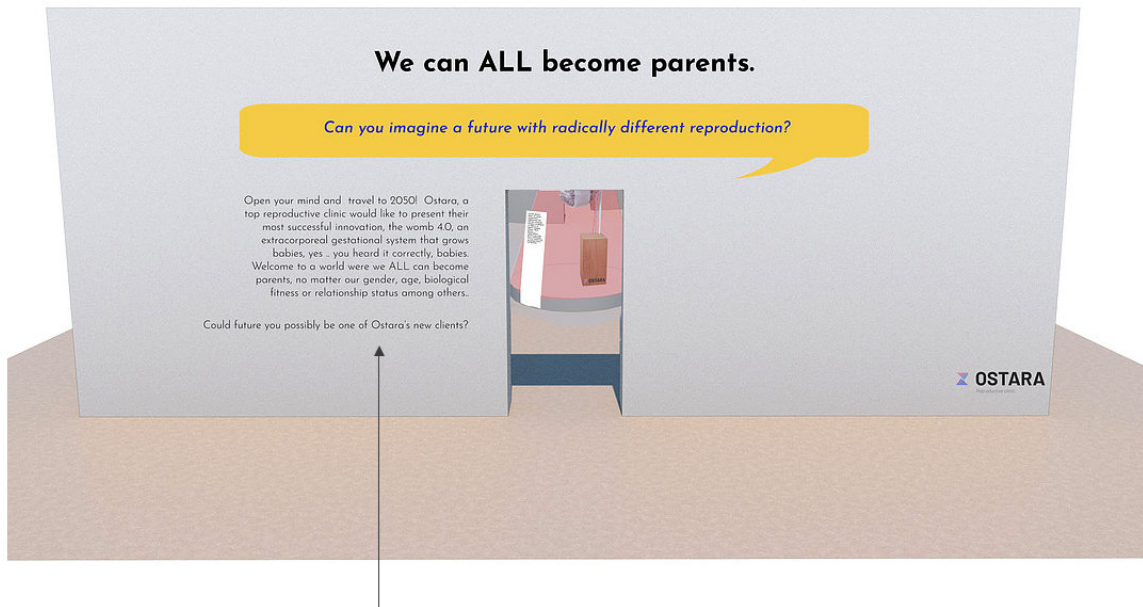


If you are here for graduation validation/testing, please start at the entrance and finish at the interactive exhibit.

Entrance

You approach an exhibition space, a yellow text balloon draws your attention, it says: "Can you imagine a future with radically different reproductive technology?" In the distance you hear a sound (please press play for the sound), you decide to approach the wall and read the information.

Press play to hear the sound.



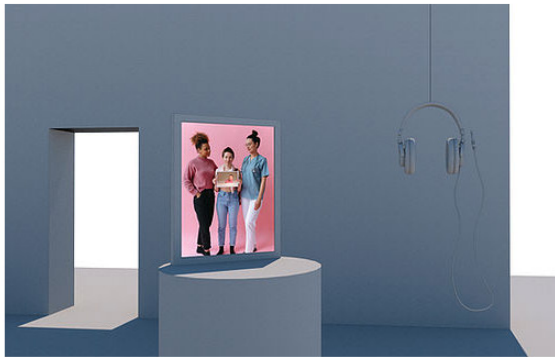
Parent stories

As you walk around the exhibit you see different elements displaying pictures of families, headphones are connected to the elements. You approach the pictures that draw your attention and listen to the stories.



Click if you are interested in what Jules & Joanna have to say

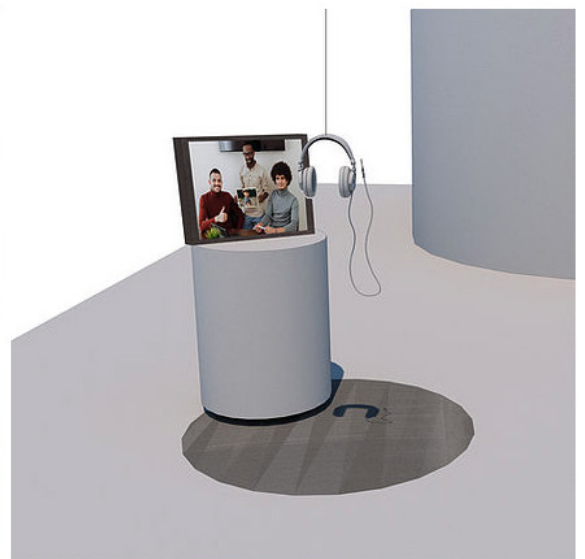
Max, Ellis & Doctor Menuri



Click if you are interested in what Max & Ellis have to say



Jonathan, Marc & Drew



Click if you are interested in what Jonathan, Marc & Drew

Dr. Menuri's story

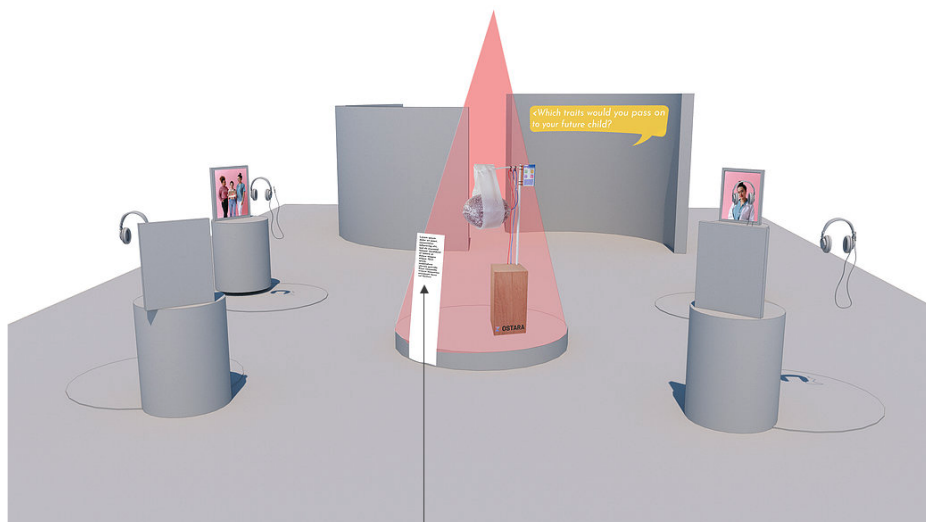
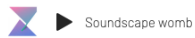
One element displays a picture of what seems like a doctor, if you are interested, approach the element.



Click if you are interested in what Dr. Menuri has to say

The overview

In the middle of the space an object is exhibited. There are sounds coming from what looks like a machine, which is highlighted by a red flashing light which blinks in time with a heartbeat. You approach and inspect what you are seeing and hearing.

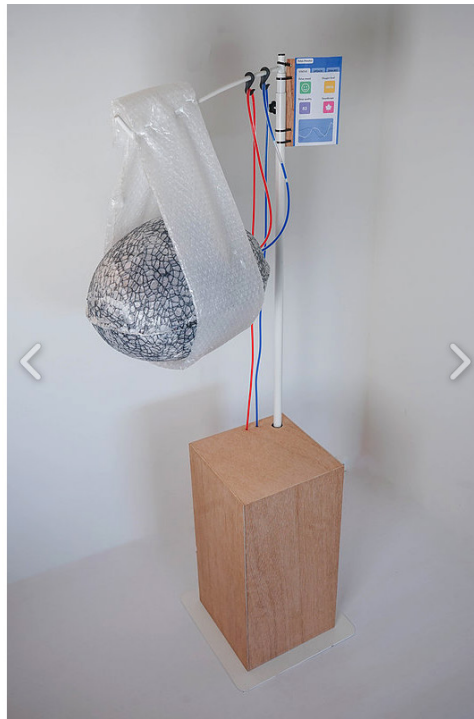


Ostara's - Womb 4.0

The womb 4.0 is Ostara's latest external womb version. It includes all basic elements that can be expected from an extracorporeal gestational system (technology that supports the development of

Closer inspection

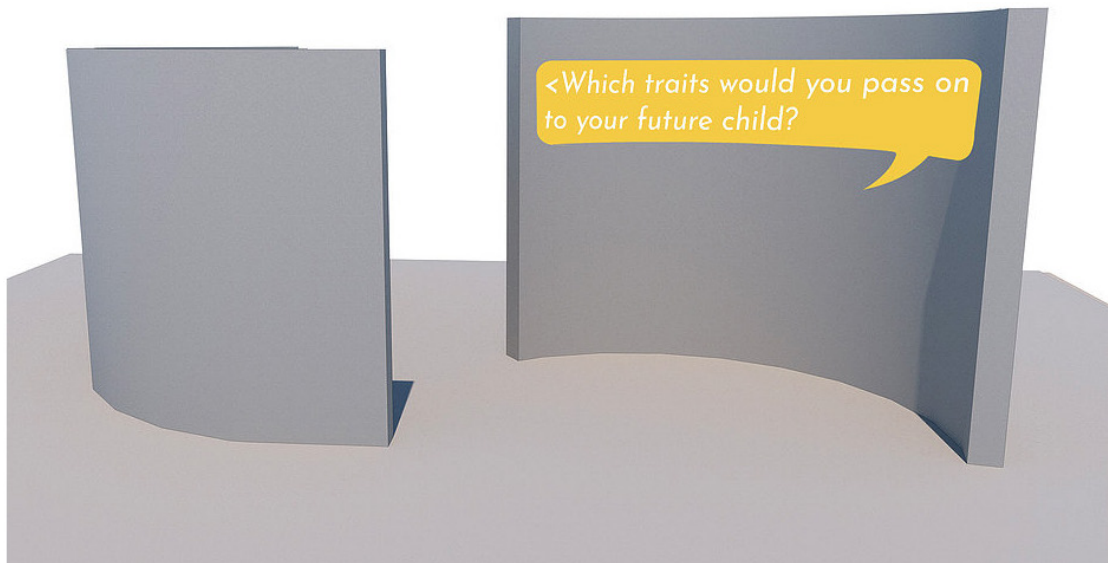
As the womb 4.0 draws you attention you decide to inspect it on a closer level. The person next to you even touches the womb, this sparks your curiosity and as you place your hand on the rounded shape of the womb 4.0 you realise the feel of the texture and the fact that the womb feels warm.



Interactive exit

Processing what you have seen and heard you approach the exit which displays a single question.

"Which trait would you pass on to your future child?"



As you round the corner a screen appears.



You decide to fill in your answer, which is: *feel free to think about your answer*



A new screen appears. See the images below.

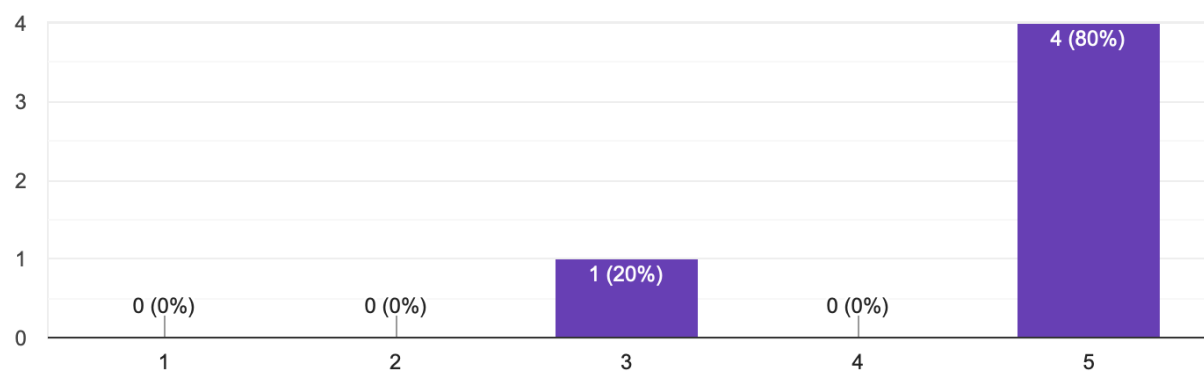
You place your hand on the scanner which starts to buzz and glow. After a few seconds a screen with information appears. It displays your biological age, blood group and other biological data. More prominently it shows a summary of traits which are deemed positive or exceptional by Ostara. In your case they advise you to select your genes that indicate a predisposition to develop muscle mass quickly and genes that show a high talent for abstract thinking, for the full report you can book a free intake with an Ostara professional.

You take in the information and decide to leave the space.

L. Questionnaire graphs

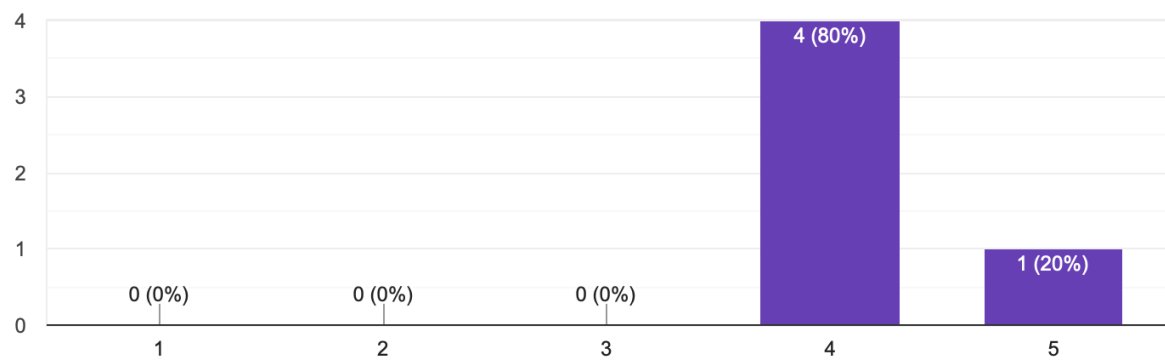
I thought the exhibit was: Mind-boggling (it was a lot of new information and some of it blew my mind)

5 responses



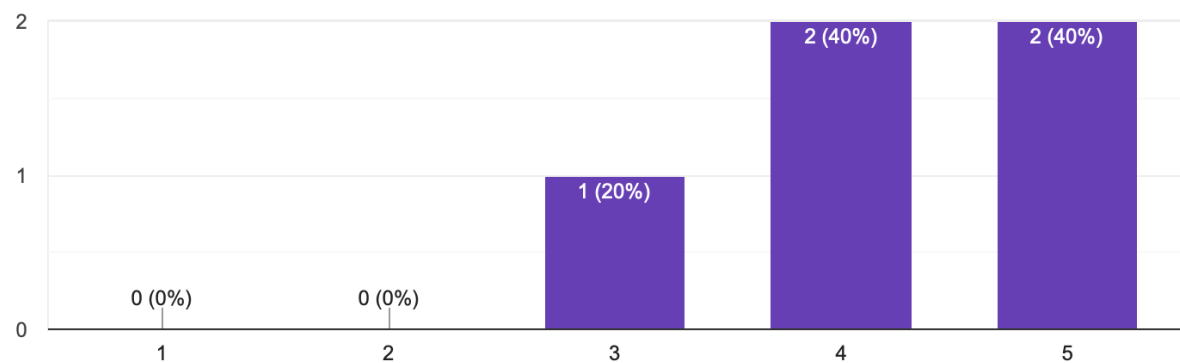
I thought the exhibit was: Layered (information was presented in different ways that could be uncovered)

5 responses



I thought the exhibit was: Challenging (it made me think)

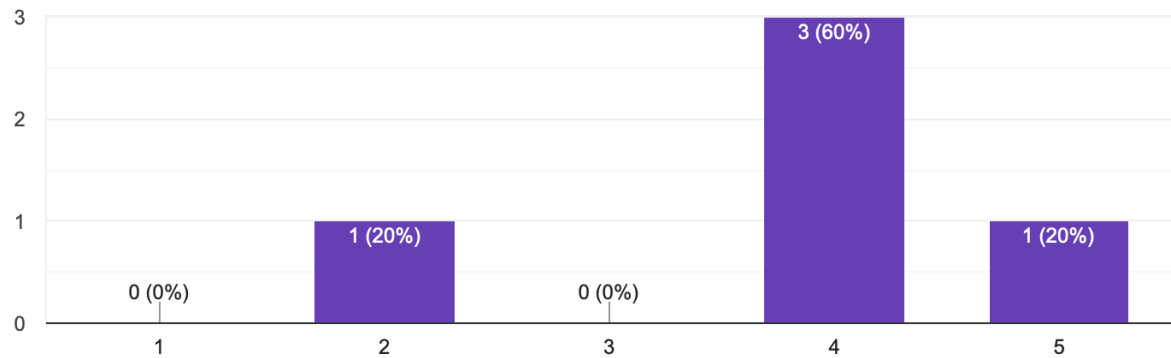
5 responses



I thought the exhibit was: Believable (even though the technology does not exist yet I was willing to believe and able to recognise)

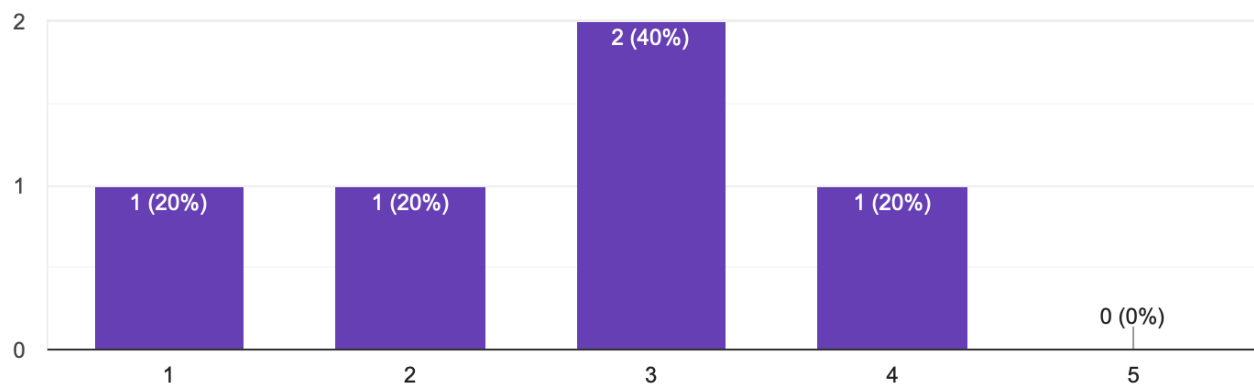


5 responses



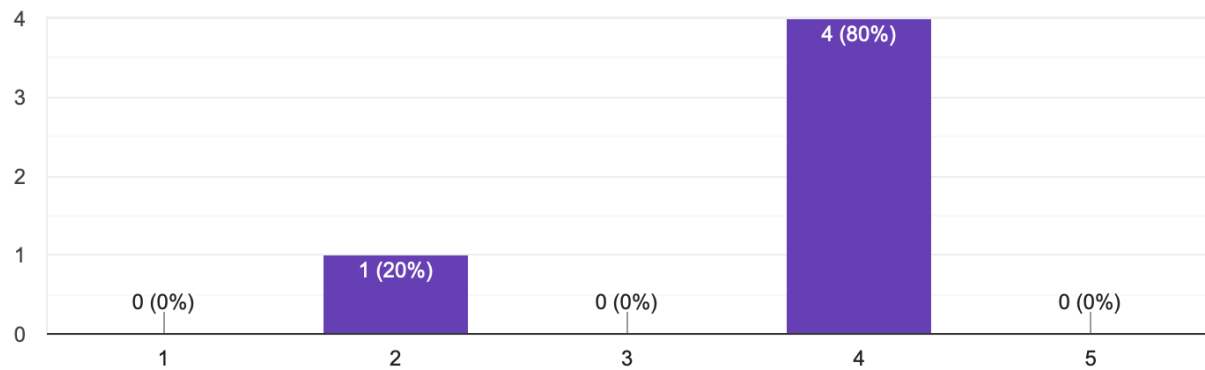
I thought the exhibit was: Weird (it made me confused and it felt uncanny)

5 responses



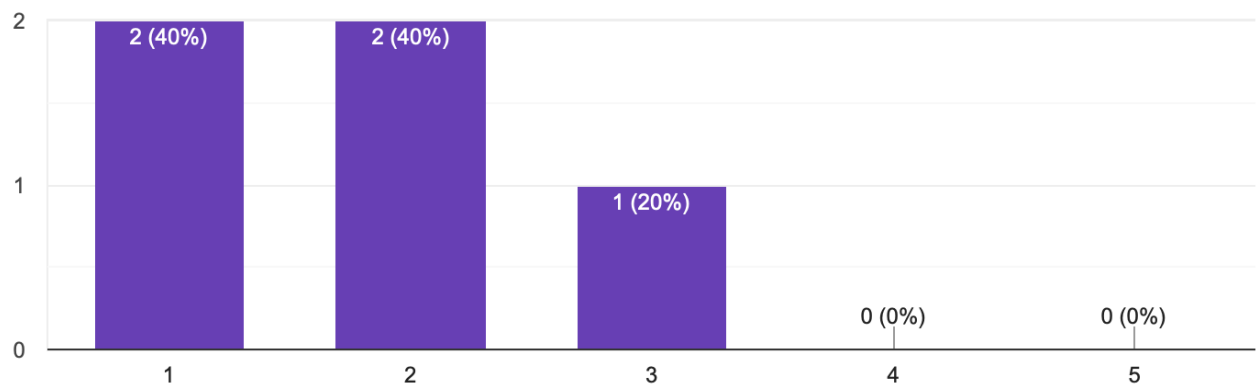
I thought the exhibit was: Captivating (it was able to attract and hold my interest)

5 responses



I thought the exhibit was: Dull (it did not interest me or spark any feelings)

5 responses



Initial Design Brief

DESIGN
FOR OUR
future



IDE Master Graduation

Project team, Procedural checks and personal Project brief

This document contains the agreements made between student and supervisory team about the student's IDE Master Graduation Project. This document can also include the involvement of an external organisation, however, it does not cover any legal employment relationship that the student and the client (might) agree upon. Next to that, this document facilitates the required procedural checks. In this document:

- The student defines the team, what he/she is going to do/deliver and how that will come about.
- SSC E&SA (Shared Service Center, Education & Student Affairs) reports on the student's registration and study progress.
- IDE's Board of Examiners confirms if the student is allowed to start the Graduation Project.



USE ADOBE ACROBAT READER TO OPEN, EDIT AND SAVE THIS DOCUMENT

Download again and reopen in case you tried other software, such as Preview (Mac) or a webbrowser.

STUDENT DATA & MASTER PROGRAMME

Save this form according the format "IDE Master Graduation Project Brief_familyname_firstname_studentnumber_dd-mm-yyyy". Complete all blue parts of the form and include the approved Project Brief in your Graduation Report as Appendix 1 !



family name Hagenaars
initials LL given name Lievijn
student number 4203623
street & no. _____
zipcode & city _____
country _____
phone _____
email _____

Your master programme (only select the options that apply to you):

IDE master(s): ☐ IPD ☒ Dfl ☐ SPD

2nd non-IDE master: _____

individual programme: - - (give date of approval)

honours programme: ☐ Honours Programme Master

specialisation / annotation: ☐ Medisign

☐ Tech. in Sustainable Design

☐ Entrepreneurship

SUPERVISORY TEAM **

Fill in the required data for the supervisory team members. Please check the instructions on the right !

** chair Tomasz Jaskiewicz dept. / section: DCC
** mentor Sjoerd van Dommelen dept. / section: HICD
2nd mentor Hendrik-Jan Grievink
organisation: Next Nature Network
city: Amsterdam country: Netherlands
comments (optional) _____

Chair should request the IDE Board of Examiners for approval of a non-IDE mentor, including a motivation letter and c.v..



Second mentor only applies in case the assignment is hosted by an external organisation.



Ensure a heterogeneous team. In case you wish to include two team members from the same section, please explain why.

Reprodutopia - Design your future family

project title

Please state the title of your graduation project (above) and the start date and end date (below). Keep the title compact and simple. Do not use abbreviations. The remainder of this document allows you to define and clarify your graduation project.

start date - - end date

INTRODUCTION **

Please describe, the context of your project, and address the main stakeholders (interests) within this context in a concise yet complete manner. Who are involved, what do they value and how do they currently operate within the given context? What are the main opportunities and limitations you are currently aware of (cultural- and social norms, resources (time, money,...), technology, ...).

The human impact on our planet can hardly be underestimated, we face among others climate change mass urbanisation and there is less 'untouched nature' than ever before.

Although many people have tried to improve our relationship with nature, few have asked the elementary question 'what is nature?'. Instead of seeing ourselves as the anti-natural species that merely threatens and eliminates nature, we could also see ourselves as catalysts of evolution. We have an urge to design and shape our environment which enables us to create a 'next nature' in which technology and nature go hand in hand.

The main question that Next Nature Networks asks is: 'what is nature and how should nature change along with us? Next Nature Network is a network of makers, thinkers, educators and supporters with its headquarters in Amsterdam. Their main goal is to start an open discussion about new technology and they do this by designing exhibitions, facilitating both discussions and workshops and linking people within their network.

With many radical developments within the field of reproductive technology for example the culturing of the embryo (s) in laboratory (International Review of Cell and Molecular Biology, 2018) the possibility to alter the sequence of DNA with the CRISPR technology (Hsu PD, Lander ES, Zhang F., 2014) and experiments with 3D-printed ovaries (Laronda, 2017) it seems that fertility medicine has already entered the realm of what was once seen as science fiction.

Technologies that follow each other rapidly and new challenges around fertility; men getting less fertile (BBC news) and trends that show woman choosing motherhood later in life, thus more woman in their forties getting pregnant than ever before (The guardian), the time to start a conversation on the role that reproductive technologies will play within our future seems to be now.

In order to start an open conversation Next Nature created the exhibition 'Reprodutopia; Design your future family'. Within this exhibition they show different designs that show how reproductive technology could shape our future. With the recent developments mentioned above they feel they are 'already behind' and there is room to add designs to their exhibition.

Sources

<https://www.bbc.com/news/health-40719743>

<https://www.theguardian.com/commentisfree/2019/apr/17/more-women-over-40-pregnant-choices-motherhood>
<https://nextnature.net>

<https://nextnature.net/projects/reprodutopia>

Hsu PD, Lander ES, Zhang F. Development and applications of CRISPR-Cas9 for genome engineering. Cell. 2014 Jun 5;157(6):1262-78. doi:10.1016/j.cell.2014.05.010. Review.

Monica M. Laronda, Alexandra L. Rutz, Shuo Xiao, Kelly A. Whelan, Francesca E. Duncan, Eric W. Roth, Teresa K. Woodruff & Ramille N. Shah, A bioprosthetic ovary created using 3D printed microporous scaffolds restores ovarian function in sterilized mice. Nature Communications volume 8, Article number: 15261 (2017)

space available for images / figures on next page

introduction (continued): space for images

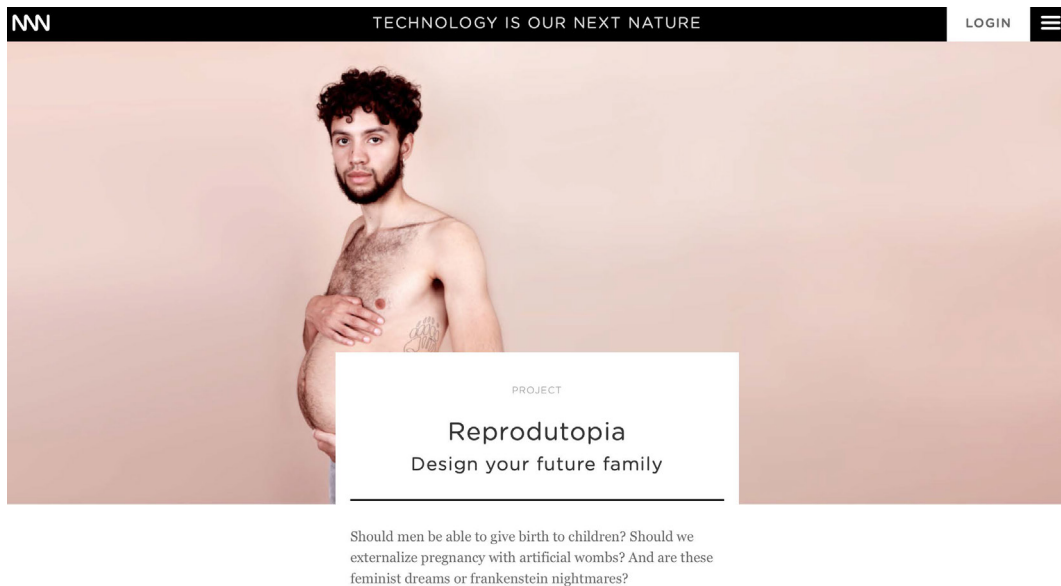
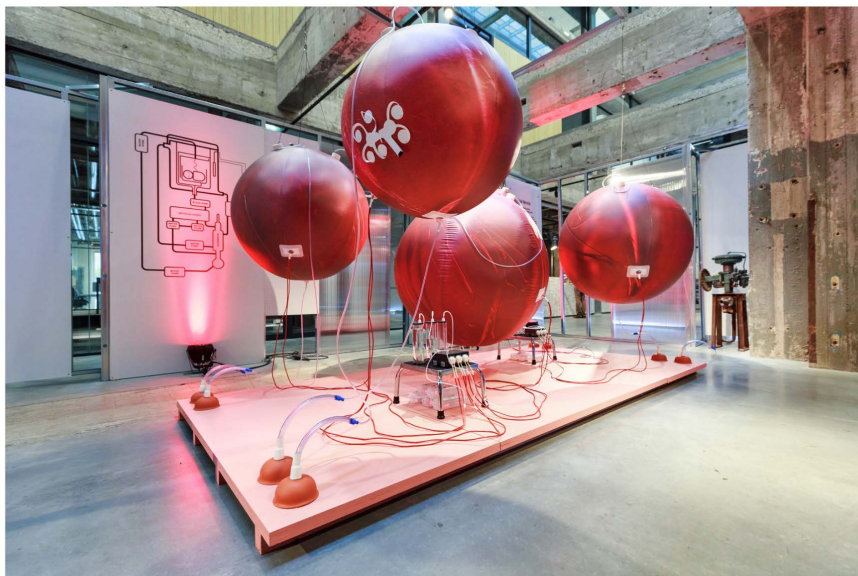


image / figure 1: Still of the Reproduptopia website.



Design for debate: the artificial womb prototype as presented at the Dutch Design Week

image / figure 2: One of the designs that is currently part of the Reproduptopia exhibition

MOTIVATION AND PERSONAL AMBITIONS

Explain why you set up this project, what competences you want to prove and learn. For example: acquired competences from your MSc programme, the elective semester, extra-curricular activities (etc.) and point out the competences you have yet developed. Optionally, describe which personal learning ambitions you explicitly want to address in this project, on top of the learning objectives of the Graduation Project, such as: in depth knowledge a on specific subject, broadening your competences or experimenting with a specific tool and/or methodology, Stick to no more than five ambitions.

I decided to contact Next Nature Network foremost because I felt enthusiastic, inspired and surprised they were doing something that so well fits with what I like and what I am passionate about.

I was part of an exhibition committee during my bachelor (competence), with whom I designed and created 3 exhibitions. I love the role design plays within exhibitions, your user is a visitor whom you both want to inform and inspire in a relatively short amount of time. I am happy I can use this previous experience within my graduation project.

Being able to include design fiction (learning ambition) excites me, it is something that is new and I like to learn more about. The same goes for the topic; reproductive futures, it is not something I know a lot about yet, I look forward to gaining in depth knowledge on a topic that is very relevant and has a very strong technological and ethical side (learning ambition).

I have experience with ViP, having used it previously in PO3, my final bachelor project and recently in the elective Vision in Product design. I like to see how it will help me within a project that already has a very futuristic feel.

Creating a prototype for the exhibition is something I deliberately want to do. I am always looking for ways to improve my prototyping skills. Literally 'making' makes me feel grounded, humble and critical. It also adds another layer of thinking while designing, knowing you are actually going to build/prototype your concept.

FINAL COMMENTS

In case your project brief needs final comments, please add any information you think is relevant.

PROBLEM DEFINITION **

Limit and define the scope and solution space of your project to one that is manageable within one Master Graduation Project of 30 EC (= 20 full time weeks or 100 working days) and clearly indicate what issue(s) should be addressed in this project.

This project will dive into the context of reproductive technologies and the social effects these new technologies will have in the future. The domain is thus: "Social impact of reproductive technologies within our futures." As was discussed with the client the exhibition currently does not focus on the social impact these new technologies might have and doing this will enrich the exhibition and add a new experience for the visitor.

The goal of the project is to both inform and inspire the visitor of the exhibition in order to start a open discussion without closing their minds. (How I want research this is discussed in the assignment part of the project brief).

The final design will be exhibited within the exhibition and will be finalized on prototype level. The scale and level of detail of the prototype depends on the chosen concept and the time I have within my graduation project, which has been discussed with the client. If for example the final concept turns out very big and thus too hard to build within the given amount of time, I could make a scale model or I could decide to work out another concept from my ideation phase.

ASSIGNMENT **

State in 2 or 3 sentences what you are going to research, design, create and / or generate, that will solve (part of) the issue(s) pointed out in "problem definition". Then illustrate this assignment by indicating what kind of solution you expect and / or aim to deliver, for instance: a product, a product-service combination, a strategy illustrated through product or product-service combination ideas, In case of a Specialisation and/or Annotation, make sure the assignment reflects this/these.

A future world created using Vision in Product design within the context: 'social impact of reproductive technologies' will guide the creation of a prototype for the Next Nature Networks exhibition 'Reprodutopia'. This prototype will help the visitor imagine and think about our reproductive futures.

Methods

In my research phase I will use Vision in Product design to create a future world and a statement. This will help me answer the following research questions:

- What do I want to evoke in the visitor of the exhibition?
- What does a future world within the given domain look like?

As the final design is based on a future vision I will also conduct desk research on Design fiction; a practice that brings together approaches from product design, science fact and science fiction. Design fiction speculates about new ideas through prototyping and storytelling. This will not only inspire me and thus help during ideation I also believe it will help me create a prototype that opens visitors minds instead of it being something they feel distant towards.

After the research phase, my project will include an Ideation phase in which I will invite fellow students and employees of Next Nature Network to brainstorm with me. In the Concepting phase I will define the 'final concept'. The final phase will include the creation of the prototype based on this final concept. The goal of the prototype is to be exhibited within 'Reprodutopia' at least once.

Personal Project Brief - IDE Master Graduation

PLANNING AND APPROACH **

Include a Gantt Chart (replace the example below - more examples can be found in Manual 2) that shows the different phases of your project, deliverables you have in mind, meetings, and how you plan to spend your time. Please note that all activities should fit within the given net time of 30 EC = 20 full time weeks or 100 working days, and your planning should include a kick-off meeting, mid-term meeting, green light meeting and graduation ceremony. Illustrate your Gantt Chart by, for instance, explaining your approach, and please indicate periods of part-time activities and/or periods of not spending time on your graduation project, if any, for instance because of holidays or parallel activities.

start date _____ end date _____

Graduation planning - part 1

																		Amount of days part 1
Calendar week	7	8	9	10	11	12	13	14	15	16	17							
Project week	1	2	3	4	5	6		7	8	9	10							
Amount of days a week	5	5	5	5	5	5		4	4*	4*								45
Analyse	Kick-off																	
Ideation							FREE									Mid-term		

* Amount of days is influenced by holidays (Easter etc.)

Graduation planning - part 2

																		Amount of days part 2
Calendar week	18	19	20	21	22	23	24	25	26	27	28							
Project week	11	12	13	14	15	16	17	18	19									
Amount of days a week	4*	4*		4	3*			4	4	4	FREE	FREE						35
Conceptualisation																		
Prototyping & Building																		
Finalising																		

* Amount of days is influenced by holidays (Kings day, white monday etc.)

Graduation planning - Finalising

						Amount of days finalising	Total amount of days
Calendar week	29	30	31	32	33		
Project week	20	21	22	23	24		
Amount of days a week	4	4	4	4	4	20	100
Prototyping & building							
Finalising							

Analysis; The first 6 weeks of the project will consist of analysis, within this phase I will work fulltime (5 days a week). After this period I will take one week off, which enables me to let go of the analysis phase (quite a deep dive) and feel fresh and inspired to start ideation.

Ideation; This phase will consist of four weeks. As my chart shows, instead of working 5 days a week I will from this point on spend on average 4 days a week on graduation. This is because I am dealing with PMDD - a mood disorder related to females their periods, which gets exponentially worse when being under a lot of pressure, therefore I prefer a little more 'room to breathe'. Within week 9, the third week of my ideation phase the midterm meeting takes place.

Conceptualisation; This phase will consist of 3 weeks in which I design a detailed final concept and start creating a prototyping plan.

Prototyping & Building; This phase will consist of nine weeks in which the prototype is both tested and created. Within this phase my green light meeting will take place. I will take week 27 and 28 off in order to have a break during the summer holiday.

Finalising; This final phase will consist of three weeks in which I will finalise the last details of the prototype if needed, shoot video's, take pictures, finalise my report (which I will update throughout the project) and create a final presentation.

APPROVAL PROJECT BRIEF

To be filled in by the chair of the supervisory team.

chair Tomasz Jaskiewicz date - - signature _____

CHECK STUDY PROGRESS

To be filled in by the SSC E&SA (Shared Service Center, Education & Student Affairs), after approval of the project brief by the Chair.
The study progress will be checked for a 2nd time just before the green light meeting.

Master electives no. of EC accumulated in total: _____ EC

Of which, taking the conditional requirements into account, can be part of the exam programme _____ EC

List of electives obtained before the third semester without approval of the BoE

☒ **YES** all 1st year master courses passed

☐ **NO** missing 1st year master courses are:

name _____ date - - signature _____

FORMAL APPROVAL GRADUATION PROJECT

To be filled in by the Board of Examiners of IDE TU Delft. Please check the supervisory team and study the parts of the brief marked **. Next, please assess, (dis)approve and sign this Project Brief, by using the criteria below.

- Does the project fit within the (MSc)-programme of the student (taking into account, if described, the activities done next to the obligatory MSc specific courses)?
- Is the level of the project challenging enough for a MSc IDE graduating student?
- Is the project expected to be doable within 100 working days/20 weeks ?
- Does the composition of the supervisory team comply with the regulations and fit the assignment ?

Content: ☐ **APPROVED** ☐ **NOT APPROVED**

Procedure: ☐ **APPROVED** ☐ **NOT APPROVED**

comments

name _____ date - - signature _____